I WAS ALWAYS TRYING TO DO EVERYTHING AT ONCE

mindfulness-based stress reduction
for medical clerkship students

inge van dijk

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Inge van Dijk

The research in thesis was supported by a grant of:
Department of Evaluation, Quality and Development of Education (EKO)
Radboud University Medical Center, Nijmegen, the Netherlands

ISBN: 978-94-92896-39-1
Layout: Inge van Dijk
Cover design: Inge van Dijk
Printed by: GVO drukkers & vormgevers, Ede

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Proefschrift

ter verkrijging van de graad van doctor
aan de Radboud Universiteit Nijmegen
op gezag van de rector magnificus prof. dr. J.H.J.M. van Krieken,
volgens besluit van het college van decanen
in het openbaar te verdedigen op 21 juni 2018
om 12.30 uur precies

door

Inge van Dijk
geboren op 18 maart 1979
te Leusden

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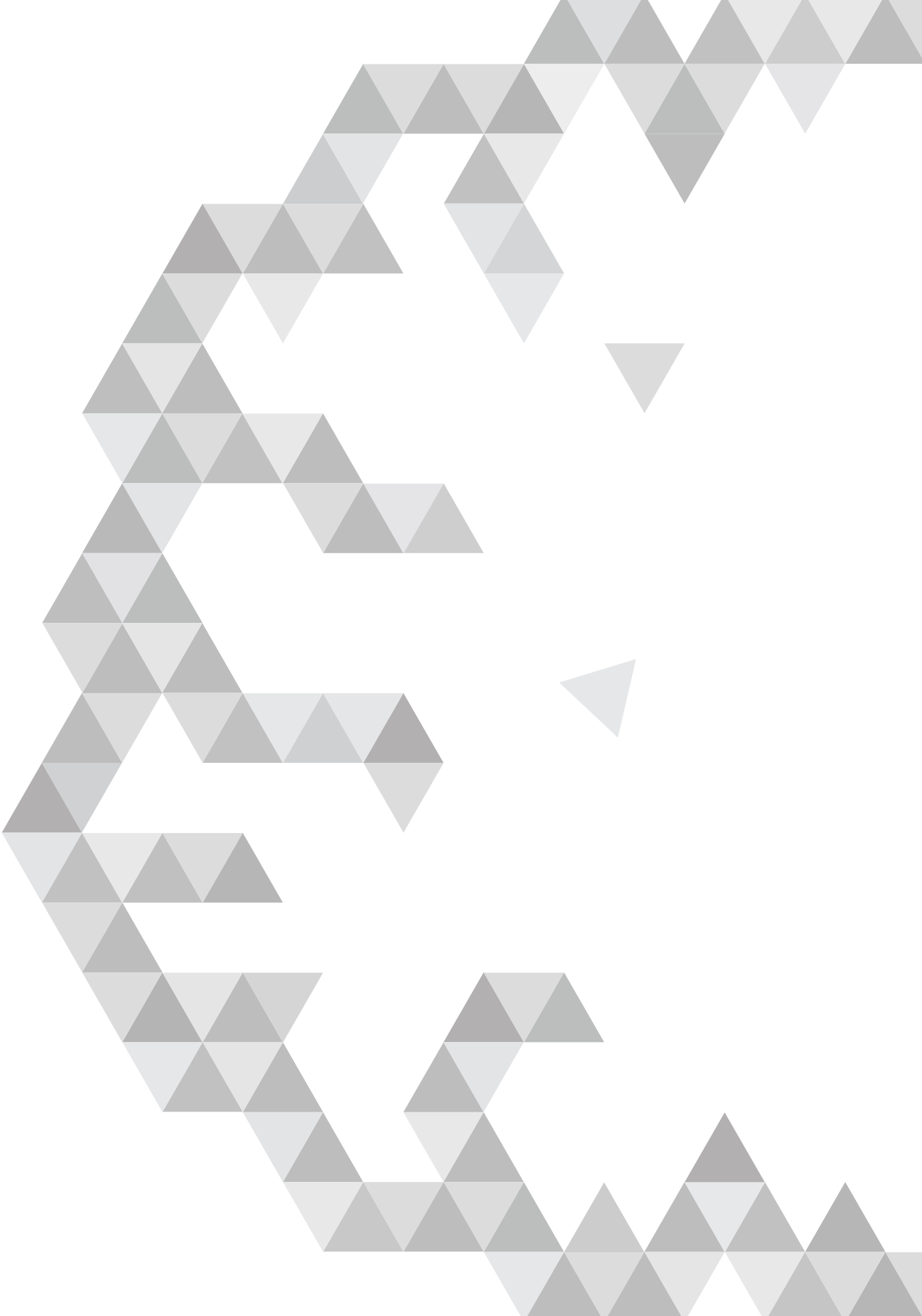

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General introduction

INTRODUCTION

When starting medical school, I had just finished a four year occupational therapy study in which I had gotten used to regular self-reflection, setting up personal learning objectives and intensive guidance in small groups throughout my internships. Surprisingly, during medical school there was much less support in developing myself as professional. Reflection in our large clerkship groups was mainly focused on understanding difficult cases rather than on our own strengths and weaknesses. It seemed commonplace that clerkship students were regularly confronted with difficult situations without someone helping them to deal with these sometimes life changing experiences. When my father suddenly passed away in the last phase of my clerkships, the clerkship coordinator said that he was very sorry for my loss but that I had to compensate for my week of absence during my holidays. Some of my fellow students were not allowed to attend the funeral as my father was not directly related to them. In my view, this was representative of the hospital culture I experienced throughout my clerkships, during which I certainly would have benefited from more personal support. Based on the stories my fellow students told me, my experience seemed the rule rather than the exception. Thus, my personal motive for carrying out the work described in this thesis was to examine if there are means to support clerkship students in dealing with their experiences during this demanding period of their life. In addition, I hoped that teaching students to allow and examine their thoughts, feelings and needs in a non-judgmental way, would make a small contribution to a more compassionate culture for the next generation of doctors.

Professional context

Besides this personal motive, this research project also resulted from general and growing concerns about the well-being of medical students and physicians. In 2009, the Dutch medical community was shocked by the fact that 21% of their medical residents (junior doctors) appeared to suffer from burnout.[1] This resulted in an online discussion between people criticizing the healthcare system and long working hours of medical residents and those questioning the competencies of the current generation of residents compared to the 'never complaining' generations before.[2,3] In the same year, the Student Board of the Royal Dutch Medical Association (KNMG) reported that one in three medical students often feels overwhelmed by work pressure and fear of failure during clinical clerkships.[4]

The research project described in the present thesis was set-up in response to the above concerns. The aims of the study were to explore: (1) the mental health of medical clerkship students; (2) the effect of mindfulness-based stress reduction (MBSR) on mental health and; (3) the effect of MBSR on student-patient empathy, which was found to decline in distressed students.

1. Mental health of medical clerkship students

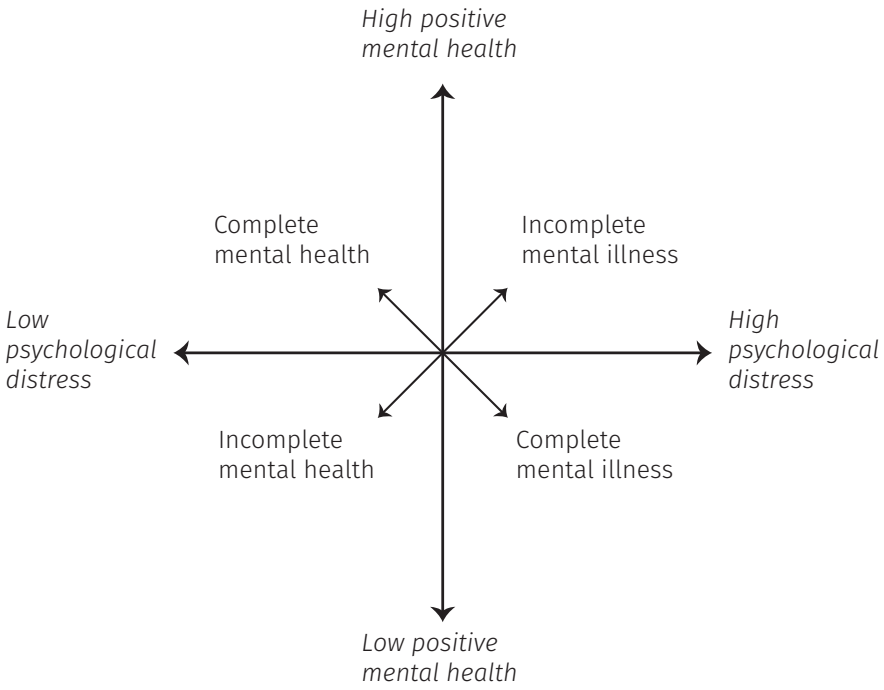
Before summarizing current literature about mental health of medical students, it is important to get an understanding of the Dutch medical curriculum and the terminology used in this thesis. There are substantial worldwide differences between medical curricula for both undergraduate and postgraduate education. American medical school can be entered after completing at least three years of university level pre-med courses, while Canadian students usually complete a bachelor's degree first. On contrary, Dutch students enter medical school after secondary education. Most Dutch medical schools offer a three-year bachelor program consisting of basic science courses followed by a three-year master's degree including clinical clerkships. Currently, the three-year clerkship program in Nijmegen includes workplace rotations in different hospitals that are alternated with periods of classroom teaching, evaluating past clerkships and preparing for future clerkships. Worldwide there are many variations to these two types of curricula. In this thesis 'clinical clerkships' refer to the pre-graduate period of clinical rotations and 'residents' refer to post-graduated physicians either in training to specialize or not in training, but working to gain experience or preparing for a specialization.

Mental health

The World Health Organization described mental health as "a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community".[5] Despite this, in current medical practice 'mental health' is still used synonymous with the absence of psychological distress.[6] In this thesis, psychological distress refers to unpleasant feelings, thoughts or behaviors which can hinder a person's functioning such as anxiety, loneliness, sadness, dizziness, trouble concentrating, sleeping problems and feeling irritable. One way to assess psychological distress is by means of a validated symptom checklist. Clinically relevant mental problems are supposed to be present when the level of symptoms exceeds a predefined cut-off score or when there are so many symptoms that it fulfills the criteria of a mental disorder according to the Diagnostic and statistical Manual of Mental disorders (DSM-5).

Instead of focusing only on the presence or absence of psychological distress, recent literature introduced the concept of positive mental health.[7] Positive mental health exists of the experience of positive emotions, such as happiness and satisfaction, combined with adaptive psychological and social functioning. People who are flourishing feel well and in control of their life almost every day, while people who have a languishing positive mental health lack these positive feelings and environmental mastery. Positive mental health and psychological distress

Figure 1 *Complete state of mental health (Keyes, 2005)*



can be seen as two related, but distinct dimensions (Figure 1).[8,9] Experiencing no psychological distress does not necessarily imply the presence of a flourishing positive mental health. Assessing psychological distress combined with positive mental health, better predicts a person's psychosocial functioning than either of them alone.[8–10]

Mental health of medical clerkship students

Research on medical student mental health also focused on the presence or absence of psychological distress rather than on positive mental health. Two extensive reviews of medical student distress inside[11] and outside North America[12] described 28 studies on general psychological distress with prevalence rates between 12.2% and 96.7%. In both reviews the included studies were too heterogeneous to conduct a meta-analysis. The authors of the second review suggested that publication bias might have contributed to the high rates of distress.

Contrary to the many studies about psychological distress, there is only one study exploring the prevalence of positive mental health in American medical students of all years of medical education. Among 2.682 students, 53.1% reported a flourishing, 42.5% a moderate and 4.3% a languishing mental health (defined by the Mental

Health Continuum-Short Form).[13] Looking at related constructs such as 'quality of life' in medical students, the few studies available suggest that this fluctuates throughout the years of medical education[14,15] and might be at its lowest in the year of transfer towards clinical clerkships.[16,17]

How does the Dutch situation relate to this? So far, very little research has been conducted among Dutch medical students. A cross-sectional study among 814 preclinical and 316 clerkship students reported a total prevalence of common mental disorders (depression, anxiety, stress and PTSS) of 54% in preclinical and 48% in clinical clerkship students.[18] From the same research group a longitudinal study was recently published, reporting that 47% of 2134 students suffered from symptoms of depression and/or anxiety.[19] After one year follow-up, the authors found a similar prevalence of 46% in the 951 who completed the survey for the second time. Finally, a third Dutch study in 433 preclinical medical students reported prevalence rates of burnout-, depression- and anxiety-related symptoms of 46%, 27% and 29%, respectively.[20] The prevalence rates reported in these three studies are high compared to other Western developed countries.[12] This might be caused by selection bias as response rates were modest (33%-52%). There is no information about Dutch medical student positive mental health available.

Clinical clerkships challenges and mental health

Clinical clerkships are characterized by specific challenges. For most students it is the period in which they get to know all aspects of their future profession for the first time. They are confronted with its responsibilities, dilemma's, and high work load and move from being 'unconscious incompetent' to 'conscious incompetent'. This transition to clerkships can cause an increase of psychological distress.[21,22] When moving to an environment with new expectations, tasks and responsibilities students need to "relearn what they thought they knew".[23] Pressure of work during clinical training, the perceived lack of guidance and the need to be seen as confident and competent future doctors in interaction with colleagues and patients are experienced as particularly stress increasing.[24] In addition, many students feel that they are being taken advantage of.[25]

Dutch clerkship students seem no exception in this regard. They experience their clerkships as a period of high demands and low personal efficacy.[4] Prince and colleagues reported that problems experienced by Dutch students arose largely from difficulties in adapting to a new role and different tasks and from difficulties in the application of knowledge and skills.[26,27] Students' preclinical knowledge and skills seem to play a minor role in the perceived difficulty of the transition period.[28] Although studies on how the specific challenges of clerkships relate to positive mental health are lacking, there is one qualitative interview study in medical

students about their quality of life. Quality of life appeared to decrease due to work pressure, scarcity of time and bad teachers. It increased by having a curriculum with more autonomy, good teachers and by contact with patients, which made students feel useful.[29]

Student characteristics influencing mental health

Besides the above mentioned *workplace* related factors also a number of *personal* factors are associated with psychological distress and positive mental health in medical students. Higher levels of neuroticism, perfectionism, performance-based self-esteem and disengagement corresponded with more depressive symptoms.[11,29,30] While higher levels of self-actualization, self-awareness and a sense of fulfilment were related to lower levels of depression.[11] Looking at positive mental health, a flourishing mental health was more prevalent among American medical students in a relationship and white students compared to single and non-white students, while positive mental health seemed unrelated to gender, age and financial situation.[13] A Swedish longitudinal study showed that medical students who sustained high levels of life satisfaction perceived medical school as interfering less with their social and personal life, and were less likely to use emotion focused coping, such as wishful thinking, than their peers.[15]

Consequences of medical student mental health

Mental health can influence students' individual behavior as well as their interaction with patients. A higher level of stress and depression in medical students is related to more thoughts of dropping out of medical school[32,33] and to potentially harmful methods of coping, such as excessive alcohol consumption.[34–36] Clerkship performance and empathy were reduced in students with higher levels of psychological distress.[37] Positive mental health on the other hand, supported students with burnout in maintaining altruistic professional values, possibly because despite the burnout they still felt meaningful.[31] Moreover, the prevalence of unprofessional behaviors declined as positive mental health improved. Flourishing students less often reported a lower prevalence of suicidal ideation within the last 12 months, less thoughts of dropping out of medical school and had engaged more often in providing care to the medically underserved outside of a clerkship. The authors suggest that for the good of both society and individual students, medical schools should help students not only to avoid professional distress, but also to learn strategies that promote positive mental health.

Interventions to improve medical student mental health

Taking action to improve mental health already during medical school is relevant because perceived stress in medical school reduces work satisfaction as physician and

predicts later job related problems[38,39] and unprofessional behavior during medical school seems to predict subsequent unprofessional conduct once in practice.[35,36] Similar to factors contributing to mental health, interventions to improve mental health can also be *workplace directed* such as changing the length and type of curriculum or the grading system, or *person directed* such as offering self-hypnosis, meditation, mindfulness-based stress-reduction, feedback on various health habits and educational discussion. A review of 13 randomized and non-randomized controlled trials on stress management programs in medical students concluded that replacing the tiered grading system with a pass/fail evaluation system reduced competitiveness and enhanced student well-being without compromising academic performance.[40,41] In addition, person directed interventions that were effective in reducing medical students distress included mindfulness-based stress reduction or meditation techniques and self-hypnosis.[42]

2. Effects of mindfulness-based stress reduction training on mental health of medical clerkship students

In the 1970s molecular biologist Jon Kabat-Zinn became increasingly fascinated by Buddhist practice. In 1979 he founded a stress reduction clinic at the University of Massachusetts Medical School, where he tried to integrate Buddhist teachings on mindfulness within western society. He adopted 'mindfulness' as an umbrella term to carry multiple meanings and Buddhist traditions simultaneously. Kabat-Zinn described mindfulness as 'intentional self-regulation of attention from moment to moment' which is not a cognitive or intellectual activity but a direct, authentic, first-person experience during which an attitude of non-striving, not knowing and non-attachment to (positive) outcomes is practiced. Kabat-Zinn integrated this in an eight-week training for groups with sessions of 2.5 hours, removing its original Buddhist context to make it more accessible for use in patients.[43] He aimed to help chronic pain patients cope with stress and pain caused by their condition. MBSR training combines the practice of bodily awareness, sitting and walking meditation, yoga (mindful movement) and group inquiry with psycho-education about the causes and consequences of stress and of coping with stress. Next to this 'formal practice' participants are encouraged to cultivate 'informal practice': awareness of thoughts, feelings and bodily perceptions during daily activities such as taking a shower or brushing one's teeth. Participants receive audio guided mindfulness exercises, an information folder and are asked to practice up to 45 minutes a day.[44]

Effects of MBSR on the mental health of medical students

According to recent meta-analyses, mindfulness-based interventions are effective in reducing various complaints such as depression, anxiety and general distress in

Table 1 *Overview of studies on the effects of manualized MBSR interventions in medical students*

Author (year)	Design	Population	N (%)	Intervention	Outcome measures	Results	Effect size
Danilewitz (2016)	RCT (pilot)	Preclinical students	First 30 applicants	8 x 1-1.5 hour peer-led sessions versus waitlist control	Depression, anxiety, distress (DASS), empathy (JSPE), mindfulness (FFMQ), self-compassion (SCS), Altruism (AAS)	Stress ↓, self-compassion ↑, altruism ↑, two mindfulness facets ↑	Cohens'*d*= 0.33-0.65
Erogul (2014)	RCT	First-year preclinical medical students	58 (72%)	8 x 75 minutes in four weeks versus usual care	Stress (PSS), Resilience (RS), and Self-Compassion Scale (SCS)	Stress ↓, self-compassion ↑	Cohens'*d*= 0.51-0.97
Garneau (2013)	Pre-post design	Fourth-year clinical clerkship students	58 (?)	8 x 2,5 hour twice a week + 6 hour silent retreat	Depression (BDI-II), burnout (MBI), stress (PSS-10), well-being (SPWB), self-compassion (SCS) and mindfulness (MAAS)	emotional exhaustion (subscale burnout) ↓, depression ↓, self-compassion ↑ and mindfulness ↑.	Cohens'*d*= 0.38-0.58
Rosenzweig (2003)	Cohort controlled	Second-year preclinical medical students	302 (±18%)	10 x 1,5 hour elective versus other electives	Mood disturbance (POMS)	Total mood disturbance ↓	Cohens'*d* pre-post: -0.18
Shapiro (1998)	RCT	Premedical & 1st & 2nd year medical students	78 (39%)	7 x 2,5 hour MBSR versus waitlist control	Psychological distress (SCL-90), Depression (SCL-90), State Trait Anxiety (STAI), Empathy (ECRS), Spiritual Experiences (INSPIRIT)	Psychological distress ↓, depression ↓, state anxiety ↓, trait anxiety ↓, empathy ↑	None reported

clinical as well as healthy populations.[45–47] Despite the enormous rise in studies of MBSR in all kinds of target groups, studies in medical students are scarce, especially in clinical clerkship students. Three RCT's and one non-randomized trial examining interventions similar to the manualized eight-week MBSR for preclinical students[48,49] or mixed groups of medical and other students,[50,51] reported a significant reduction of different types of psychological distress (Table 1). The only study focusing on medical clerkship students reported a significant reduction in depression, emotional exhaustion and perceived stress after a mindfulness elective (n=58),[52] but lacked a control group as well as a follow-up. Response rates were modest (18%-39%) or unreported in all but one of the studies. Only Erogul and colleagues, who allocated students to the intervention or control group before inviting them to participate, reached a high response rate of 72%.

Studies exploring effects of MBSR on positive mental health are a minority. Three studies found a significant increase in self-compassion after MBSR,[48,52,53] contrary to resilience[53] and subjective well-being,[52] which did not increase. Positive mental health comprising of both emotional well-being as well as adaptive psychological and social functioning has not been assessed before.

In addition to these quantitative results, there is 1 qualitative study examining the short term experiences of preclinical medical and psychology students upon completion of MBSR by means of interviews and a focus group. Students reported a rise or shift in deliberate attention and an attitudinal change as two main experiences, which were mediated by their intention towards mindfulness practice and their interpretation of mindfulness training.[54]

3. Effect of mindfulness-based stress reduction on medical clerkship student empathy

Despite the rising number of studies on physician and medical student empathy in the last decennia, there is still little consistency in construct definition and assessment.[55] Over the years, empathy has been defined as a combination of cognitive, affective and behavioral factors[56] or in other words a 'thinking, feeling and acting' process.[55] In this thesis we have used the definition of Mercer and Reynolds, who define empathy as an ability to (1) understand the patient's situation, perspective and feelings; (2) communicate that understanding and check its accuracy and (3) act on that understanding with the patient in a helpful way.[56]

One of the most concerning consequences of psychological distress is that it seems to correspond to lower levels of physician-patient empathy in medical students as well as residents.[57–59] Although there is no literature available on the relationship between positive mental health and empathy, there is evidence in medical students and residents for a positive correlation between self-reported quality of life and

self-reported empathy.[59,60] This implies that improving student mental health is relevant to both students as well as patients. Next to the concerning relationship between distress and empathy, some studies even suggest a general decline of empathy levels throughout all years of medical education or specifically during the year of transfer to clinical care.[61–63] There is an ongoing debate about the value and validity of these studies[64,65] due to the low response rates and the use of self-report empathy measures, of which the clinical value is unclear.[65]

Assessing medical student empathy

Student-patient empathy can be examined by means of self-reported, patient-reported or observer-reported measures. Correlations between these three methods vary widely, suggesting that they do not measure the same construct.[65–68] Levels of self-reported empathy did not correspond to levels of observed empathy,[67] and students who self-rated as more empathic received lower competence evaluations from their peers.[66] While the clinical relevance of self-rated empathy is unclear,[65] patient-rated empathy positively influences patient-physician trust,[69] satisfaction,[69,70] compliance,[69,70] patient enablement[71] and the severity[72] and duration[73] of symptoms. Surprisingly, only 1 of the 24 quantitative studies examining undergraduate medical student empathy, used a simulated patient-rated measure[74,75] and no patient-reported empathy measures are currently available in Dutch. In English however, four patient-report measures are available of which a review reported that only the Consultation and Relational Empathy Measure (CARE measure) showed sufficient evidence of reliability and validity.[76]

Effects of MBSR on student empathy

There are at least two pathways through which mindfulness could potentially influence student-patient empathy. First, mindfulness practice can result in a reduction of psychological distress, which in turn is associated with increased empathy.[77] Second, an important aspect of MBSR is practicing self-awareness of one's thoughts, feelings and bodily signals. Self-awareness during patient contact is hypothesized to be an important contributor to empathy development.[78,79] Two studies about the effect of MBSR on preclinical medical student empathy found contradicting results. The first RCT reported a significant increase in empathy in the MBSR group compared to the control group,[51] but used an empathy measure not specifically designed for healthcare workers. The second, a pilot RCT using a peer-led MBSR, discovered no significant difference.[48] Both studies used self-report empathy measures.

Summary

Mental health consists of both the absence of psychological distress and the presence of positive feelings and positive functioning together called 'positive mental health'. Studies of mental health in medical students focus mainly on psychological distress. According to the current literature psychological distress is prevalent and related to both workplace characteristics such as the changing environment, workload and a lack of guidance as well as personal characteristics such as coping style, relationship status and self-awareness. Psychological distress can lead to reduced clerkship performance and reduced student-patient empathy, while positive mental health is associated with less thoughts of dropping out of medical school and more altruistic beliefs. There are workplace directed interventions to reduce distress such as changing the medical curriculum and person directed interventions such as cognitive-, behavioral and mindfulness interventions. In randomized controlled trials, mindfulness-based stress reduction (MBSR) decreased distress in medical students, but response rates were modest and follow-up assessments lacked. Studies about MBSR in medical clerkship students were underrepresented just as studies using positive mental health as outcome measure. As a reduction of physician-patient empathy is one of the most concerning consequences of psychological distress in medical students, finding ways to reduce psychological distress and maintain and improve empathy are very important. MBSR might be able to increase medical student empathy levels by means of lowering distress and increasing self-awareness.

AIM OF THIS THESIS

In the current thesis we aim to gain insight in the prevalence of psychological distress and positive mental health among Dutch medical clerkship students and the effects of MBSR on student mental health and simulated patient-rated empathy. We chose to examine MBSR because it is a relatively short and affordable intervention, is easily integrated in medical school curriculum with a growing body of evidence of its efficacy in other populations. As there is a rise in mindfulness interventions with various durations and content, we chose to examine the eight-week manualized MBSR, as that is most comparable to other research in this field. We examined positive mental health instead of other related constructs such as resilience or life-satisfaction because it corresponds very well to the definition of mental health of the World Health Organization, which includes both positive affect as well as adaptive psychological and social functioning. This thesis addresses the following research questions:

1. Mental health of medical clerkship students

- What is the prevalence of psychological distress and positive mental health in a sample of Dutch medical students in their clinical clerkships?
- Which factors are associated with psychological distress and positive mental health?

2. Effect of MBSR on medical clerkship student mental health

- Are medical clerkship students interested in participating in MBSR and what are the differences between those who are and those who are not?
- What is the effect of MBSR on psychological distress and positive mental health of medical clerkship students throughout their 2 years of clerkships?
- What is the nature and effect of students' long-term mindfulness practice?

3. Effect of MBSR on simulated patient-rated empathy in medical clerkship students

- What are the psychometric properties of the Dutch Consultation and Relational Empathy measure (CARE measure)?
- What is the effect of MBSR on simulated patient-rated empathy of medical clerkship students?

THESIS OUTLINE

1. Mental health of medical clerkship students

We performed a cross-sectional examination in a consecutive sample of medical clerkship students from the Radboud University Medical Center to examine the prevalence of psychological distress and positive mental health (Chapter 2). Additionally, we examined predictors of psychological distress and positive mental health among a number of demographic characteristics, dysfunctional cognitions, and dispositional mindfulness skills.

2. Effect of MBSR on medical clerkship student mental health

In Chapter 3 we describe the results of a preliminary study among medical clerkship students assessing their interest in a MBSR training. As previous studies on MBSR in medical students often reached modest response rates and offered MBSR as elective, it was unclear if selection bias had influenced the results. It is often suggested that those unwilling to participate are the ones who might need mindfulness most. By comparing students interested in MBSR to those who were not in terms of psychological distress, personality traits and mindfulness skills we wanted to contribute to answering these questions. We repeated this with the baseline data of our randomized controlled trial, comparing participants to non-participants regarding psychological distress, dysfunctional cognitions and mindfulness skills.

After this preliminary study, we conducted a cluster-randomized controlled trial among medical clerkship students, examining the effects of a mindfulness-based stress reduction training on psychological distress and positive mental health over the course of their clerkships (Chapter 4). Online questionnaires were sent at baseline and at 3, 7, 12, 15 and 20 months follow-up.

As we wanted to know more about the long-term impact of the training we interviewed 16 students around two years after participating in a MBSR training. We asked them if they still engaged in mindfulness practice and if so, to explain how and with which effects. We also explored the barriers and facilitators of maintaining their practice (Chapter 5).

3. Effect of MBSR on simulated patient-rated empathy in medical clerkship students

As we wanted to explore other ways of assessing student-patient empathy than by means of self-report questionnaires, we searched for the availability of a Dutch patient-rated measure. In a review of Hemmerdinger evaluating 36 empathy measures, there was only one patient-rated measure with evidence of reliability, internal consistency and validity, which was the Consulation and Relational Empathy measure (CARE measure). There was no Dutch version available of this instrument.

In Chapter 6 we describe the process of translating the CARE measure into Dutch and of its preliminary validation in primary care. Consequently, we used the CARE measure scores as secondary outcome measure of our randomized-controlled trial to explore the effect of MBSR on simulated patient-rated empathy, which we describe in Chapter 7.

The summary and general discussion in Chapter 8 gives a reflection on the results of this thesis and compares them to current literature. Furthermore, we describe the implications for practice, implications for future research and an overall conclusion.

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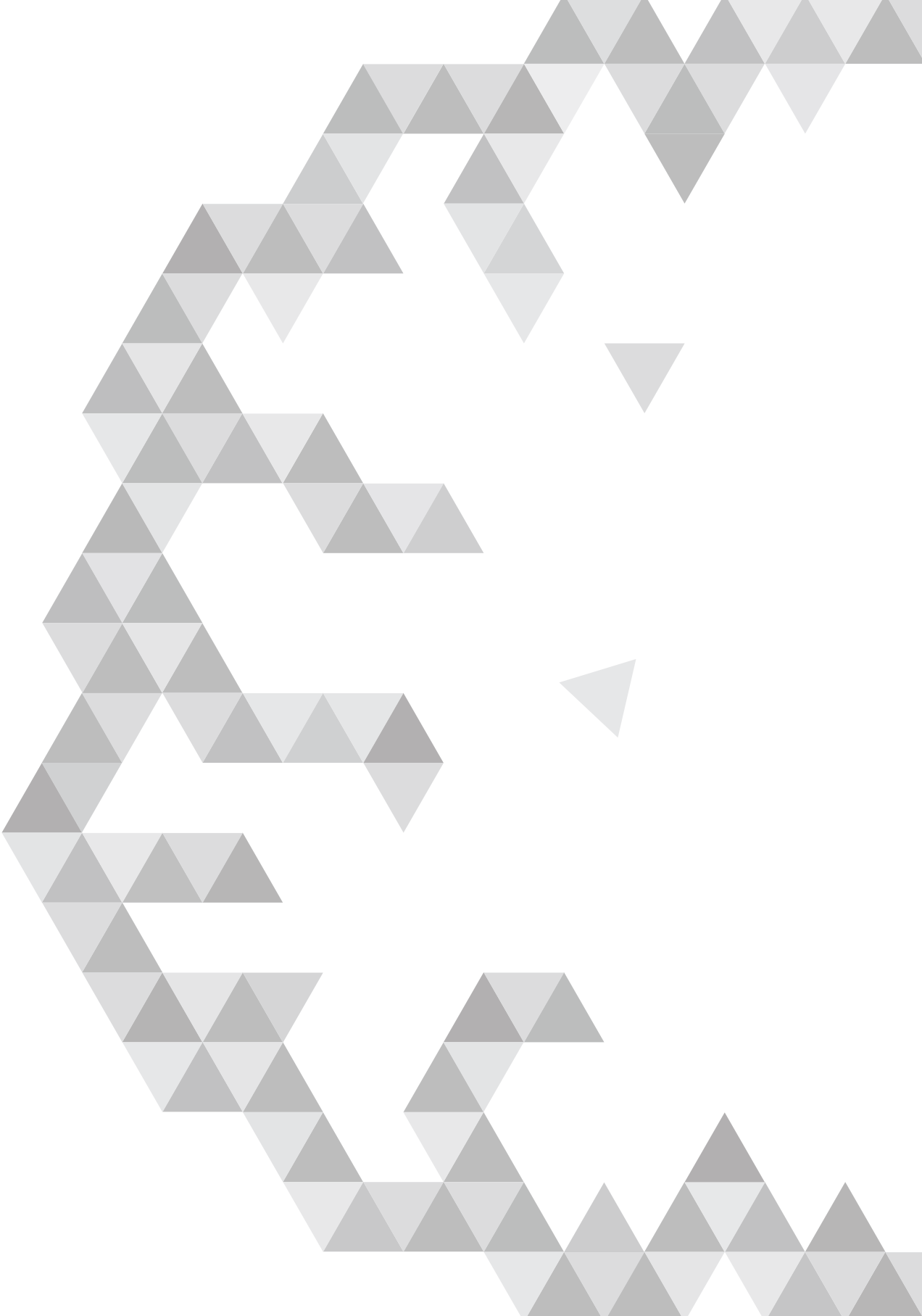

2

A cross-sectional examination of psychological distress, positive mental health and their predictors in medical students in their clinical clerkships

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BMC Medical Education, 2017

ABSTRACT

Background

Medical students can experience the transition from theory to clinical clerkships as stressful. Scientific literature on the mental health of medical clerkship students is scarce and mental health is usually defined as absence of psychological distress without assessing psychological, emotional and social well-being, together called 'positive mental health'. This cross-sectional study examines the prevalence of psychological distress and positive mental health and explores possible predictors in a Dutch sample of medical clerkship students.

Methods

Fourth-year medical students in their first year of clinical clerkships were invited to complete an online questionnaire assessing demographics, psychological distress (Brief Symptom Inventory), positive mental health (Mental Health Continuum-SF), dysfunctional cognitions (Irrational Beliefs Inventory) and dispositional mindfulness skills (Five Facet Mindfulness Questionnaire). Multiple linear regression analysis was used to explore relationships between psychological distress, positive mental health (dependent variables) and demographics, dysfunctional cognitions and dispositional mindfulness skills (predictors).

Results

Of 467 eligible students, 406 (87%) completed the assessment of whom 21% scored in the clinical range of psychological distress and 41% reported a flourishing mental health. These proportions partially overlap each other. Female students reported a significantly higher mean level of psychological distress than males. In the regression analysis the strongest predictors of psychological distress were 'acting with awareness' (negative) and 'worrying' (positive). Strongest predictors of positive mental health were 'problem avoidance' (negative) and 'emotional irresponsibility' (negative).

Conclusion

The prevalence of psychopathology in our sample of Dutch medical clerkship students is slightly higher than in the general population. Our results support conclusions of previous research that psychological distress and positive mental health are not two ends of one continuum but partially overlap. Although no conclusion on causality can be drawn, this study supports the idea that self-awareness and active, nonavoidant coping strategies are related to lower distress and higher positive mental health.

INTRODUCTION

Clinical clerkships are a valuable part of medical education in which students can lay the foundation for their professional development. Unfortunately, the transition from theory to practice can result in problems related to professional socialization, high workload and heightened levels of psychological distress.[1–5] Although this transition is known to be stressful, scientific literature on the mental health of medical clerkships students is scarce compared to literature on preclinical students and response rates are modest.[6–9] Prevalence rates of medical clerkship students scoring above the cut-off for psychopathology vary from 27% to 48%.[6,8,10,11] Mental health problems during clerkships are a predictor of postgraduate mental health problems in need of treatment.[12,13] Although there are no data available on the relationship between student psychopathology and their actual performance during clinical clerkships, we do know that higher distress, burnout, and depression in residents are associated with more self-perceived errors.[14–17]

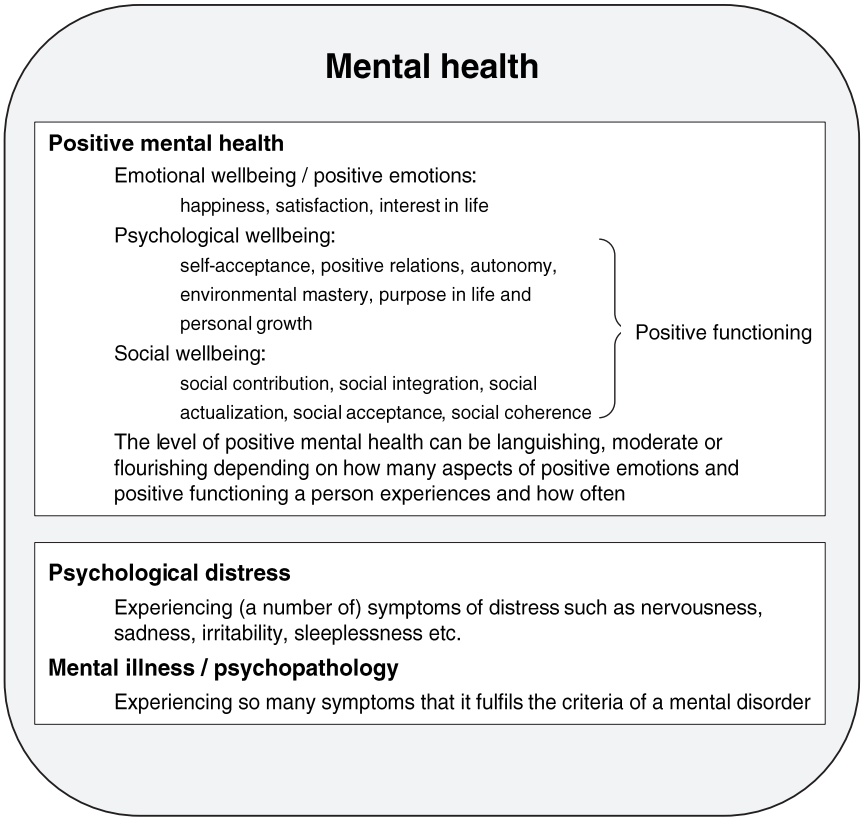
Mental health as 'presence or absence of disease' is only one approach to the well-being of medical students. In 2011, Huber and colleagues opened a discussion with their paper 'How should we define health', by stating that we should move away from the static WHO definition of health as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity'.[18] They suggest to use the more dynamic definition 'health is the ability to adapt and to self-manage', because this reflects the capacity to cope, maintain and restore one's integrity. In research on mental health, adopting this view could mean a shift from the emphasis on presence or absence of psychological distress to a broader definition in which also characteristics of psychological well-being and coping are used to determine a person's mental health.

Already for over a decade, Carol Ryff, professor of psychology at the University of Wisconsin, is studying psychological well-being of which she distinguishes six dimensions: self-acceptance, positive relations, autonomy, environmental mastery, purpose in life and personal growth.[19] Keyes and colleagues combined these dimensions of psychological well-being with dimensions of emotional well-being (e.g. being happy, interested in life and satisfied) and social well-being (e.g. feeling part of a community) which together he called 'positive mental health' or just 'mental health'. In this paper, we will use 'positive mental health' as term for psychological, emotional and social well-being while 'psychological distress' represents the experience of symptoms of distress such as sadness, sleeplessness or anxiety. Positive mental health and psychological distress both fall within the scope of the overarching concept 'mental health' (Figure 1).

Positive mental health and psychological distress are not two ends of a single continuum, but two related yet distinctive concepts, which are complementary to each other and show some overlap.[20,21] The absence of psychological distress can contribute to a positive mental health but does not guarantee or equal positive mental health and vice versa. For example, a person with a mental disorder such as an obsessive-compulsive disorder can at the same time feel happy, experience a purpose in life and have positive relations, which are aspects of positive mental health. The combination of levels of positive mental health and psychological distress is a better predictor of psychosocial functioning of a person than one of these alone.[20,22]

A cross-sectional study of Keyes and colleagues among 5,689 college students showed that higher levels of positive mental health were associated with less suicidal behavior and academic impairment in students both with and without a current mental illness.[23]

Figure 1 *Overview of terminology as used in the current paper*



Specifically in medical students, the prevalence of suicidal ideation, serious thoughts of dropping out and the prevalence of unprofessional behaviors declined as positive mental health improved.[24] Examining predictors of psychological distress and positive mental health could heighten understanding of how not only quality of life of students but indirectly also quality of patient care could be influenced positively. Looking at what is known about the predictors of psychological distress in medical students; neuroticism, perfectionism, high reality weakness, low maternal care, high performance-based self-esteem, disengagement and type A personality were found to be positively correlated with depressive symptoms.[8,13,25] While self-actualization, self-awareness and a sense of fulfilment showed an inverse correlation with depression.[25] Predictors of positive mental health (as defined by Ryff) in medical students have not been studied yet.

Current study

With the current cross-sectional study we first aim to determine the prevalence of psychological distress and positive mental health in a sample of Dutch medical students in their clinical clerkships. Second, by means of regression analysis we will explore predictors of psychological distress and positive mental health from a number of demographic characteristics, dysfunctional cognitions, and dispositional mindfulness skills. We chose to explore the demographic characteristics gender, marital status, religion and nationality as in previous research in other target groups all of them were associated with levels of psychological distress and/or psychological well-being.[26–35]

The dysfunctional cognitions we are interested in ('worrying', 'rigidity, 'need for approval, 'emotional irresponsibility' and 'problem avoidance') are based on Ellis' theory on irrational cognitions people can have about themselves, for example, the idea that suffering and misfortune is beyond their influence (emotional irresponsibility) or that one needs other people's approval to be happy (need for approval). We hypothesize the dysfunctional cognition 'worrying' to be a strong predictor of psychological distress as worrying is highly correlated to neuroticism, a known risk factor for psychological distress in the general population as well as in medical students.[12,13,36,37] We expect a less strong connection of worrying to positive mental health.

We are also interested in dispositional mindfulness; the natural ability to be aware of one's current thoughts, feelings and other experiences in a curious, non-judging way without being trained to do so. In other studies, higher levels of dispositional mindfulness were associated with lower levels of distress[38–41] and higher positive states of mind.[42] It also moderated the relationship between self-care and psychological distress and the relationship between self-control and psychological symptoms[40] and explained significant variance in psychological health.[40]

METHODS

Setting

The medical school curriculum of the Radboud University Medical Center in Nijmegen consists of a three-year preclinical Bachelor study in which students study medical theory followed by a three-year Master study consisting of clinical rotations in two- or three-month periods alternated by a one-month period of reflection, study and preparation for the next clerkship.

Subjects

From February 2011 to August 2012 we invited all first-year medical clerkship students in the fifth month of their clerkships to complete an online survey, which was accessible at home with a personalized link. All participating students gave informed consent before completing the survey.

Ethical considerations

The study was embedded in two studies which were approved of by the medical ethical research committee Arnhem-Nijmegen.

Outcome measures

Psychological distress

The Brief Symptom Inventory (BSI) is a 53-item questionnaire, measuring psychological symptoms of distress. It can be used in both clinical and non-clinical populations. It focuses on dimensions of somatization, cognitive problems, interpersonal sensitivity, depression, anxiety, hostility, phobic fear, paranoid thoughts and psychoticism.[43] A five-point Likert scale is used to score items from 'none-at-all' to 'extremely'. The mean score on all 53 items, which is called the 'global severity index' (range 0-4), is widely used in studies as a measure of overall psychological distress. A higher score implies a higher level of psychological distress. The Dutch BSI has been found to have a high reliability and high validity.[44,45] A cut-off score of 0.58 or higher on the global severity index is proposed for screening on psychopathology.[44]

Positive mental health

We used the 14-item Mental Health Continuum-Short Form (MHC-SF) as a measure of positive mental health, consisting of the three dimensions emotional, psychological and social well-being. Emotional well-being exists of three items assessing how often during the past month a person was feeling happy, interested in life and satisfied. Psychological well-being is measured by six items based on the model of Ryff assessing self-acceptance, positive relations, autonomy, environmental

mastery, purpose in life and personal growth. Social well-being is assessed by five items asking about social contribution, social integration, social actualization, social acceptance and social coherence. Together the eleven items of social well-being and psychological well-being are called the items of positive functioning (Figure 1).[21] All 14 items range from 'never' to 'daily' on a six-point Likert scale, total score range 0-70. A higher score indicates a higher level of positive mental health. The degree of positive mental health of a person can also be expressed in the categories 'flourishing', 'moderate' and 'languishing' mental health. Experiencing 'every day' or 'almost every day' at least one of the three items of emotional well-being and at least six of the eleven items of positive functioning during the past month or two weeks is considered 'flourishing mental health'. 'Languishing mental health' is categorized in persons with a combination of low scores on at least one item of emotional well–being and on at least six items of positive functioning. All other combinations represent 'moderate mental health'. Studied in a representative sample of the Dutch population, internal reliability was high (α=0.89) and validity good for the Dutch total MHC-SF.[21]

Possible predictors

Demographic variables
We assessed age, gender, relationship status and religious background.

Dysfunctional cognitions
We used the five subscales of the 50-item Irrational Beliefs Inventory to assess students' irrational cognitions, which are considered to be related to a person's vulnerability for developing psychopathology.[46] The IBI is derived from the Irrational Beliefs Test[47] and the Rational Behavior Inventory[48] but with improved psychometric quality. The subscales are worrying, rigidity, need for approval, problem avoidance, and emotional irresponsibility. They are rated on a five-point Likert scale from 'strongly disagree' to 'strongly agree', total score range 50-250. A higher score indicates a higher level of dysfunctional cognitions. In a randomly selected Dutch university student sample validity and reliability (α=0.83-0.85) were satisfactory.[49,50]

Mindfulness skills
With the 39-item Five Facet Mindfulness Questionnaire (FFMQ) five domains of mindfulness skills are assessed: observing, describing, acting with awareness, non-judging of inner experience and non-reactivity to inner experience.[51] Items are rated on a five-point Likert-type scale from 'never or very rarely true' to 'very often or always true', total score range 39-195. A higher score implying a higher level of mindfulness skills. The subscales of the Dutch FFMQ have been shown to have good internal consistency.[52]

Statistical analysis

We collected all data by means of an online survey tool (Limesurvey) and exported them to IBM SPSS statistics 21.0 for analysis.

Descriptive statistics

We used descriptive statistics to assess all variables. We used independent sample t-tests to compare age and gender of all participating students and non-participants and to compare positive mental health scores of men and women. For the dependent variable psychological distress, we used a non-parametric test to compare scores across men and women, because of skewed data. Despite this, we reported mean instead of median scores, for the sake of comparability across literature and clarity in reporting cut-off scores to determine individual cases.

Analyses

In preparation of performing multiple linear regression analyses, we used Kolmogorov-Smirnov tests and visual inspection (Q-Q plots, histograms) to assess normality of all variables. Assumptions of linearity, heteroscedasticity, and independence of residuals were assessed by means of inspecting residual plots. We assessed correlations between each of the two dependent variables and the independent variables (demographic characteristics, dysfunctional cognitions, and mindfulness skills) using Pearson's correlation coefficient (r) and Spearman's rho in case of non-normal distributions. Psychological distress and positive mental health were our primary outcome measures (dependent variables). We used the global severity index of the Brief Symptom Inventory as a measure of psychological distress and the total score of the Mental Health Continuum-SF as a measure of positive mental health. We performed multiple linear regression analyses to assess relationships between our dependent and independent variables. As students were grouped in classes at the time of inclusion, data was nested, therefore the intra-class correlation coefficient (ICC) was calculated for both dependent variables to assess if multilevel regression was necessary. In both dependent variables the ICC was redundant and therefore required no further multilevel analyses. Independent variables with significant correlations with the dependent variable were entered into the model simultaneously. Multicollinearity was assessed by means of correlation matrices, tolerance and Variance Inflation Factor (VIF) values. Durbin-Watson statistics were calculated to assess the dependence of variables. To investigate the unique relationship of psychological distress with the independent variables we corrected for positive mental health by entering it in the model. Also, to investigate the unique relationship of positive mental health with the independent variables, we entered psychological distress in the model. By means of backward elimination, variables with non-significant contributions to the model were removed. Both final models

contained only the variables contributing significantly to the model. Squared semi-partial correlations were computed to determine the proportion of unique variance that each predictor contributed to the total explained variance of the model.

Table 1 *Characteristics of participating medical clerkship students (n=406)*

Demographic characteristics	
Age, median	23.0
Female gender, n (%)	306 (75.4)
Marital status, n (%)	
Single	170 (41.9)
In relationship, not married	225 (55.5)
Married	10 (2.5)
Divorced	1 (0.2)
Nationality, n (%)	
Dutch	388 (95.6)
German	9 (2.2)
Other	4 (0.9)
Missing	5 (1.2)
Religion, n (%)	
Atheist	196 (48.3)
Catholic	120 (49.6)
Protestant	24 (5.9)
Muslim	11 (2.7)
Other	49 (12.1)
Missing	6 (1.5)
Personal characteristics	
Dysfunctional cognitions, mean score (SD)	
Worrying *(range 12-60)*	33.5 (7.6)
Rigidity *(range 14-70)*	36.0 (5.8)
Need for approval *(range 7-35)*	23.5 (4.3)
Emotional irresponsibility *(range 7-35)*	22.2 (4.0)
Problem avoidance *(range 10-50)*	23.1 (4.9)
Mindfulness skills, mean score (SD)	
Observing *(range 8-40)*	21.6 (5.6)
Describing *(range 8-40)*	28.0 (5.9)
Acting with awareness *(range 8-40)*	29.7 (5.6)
Non-judging *(range 8-40)*	30.9 (6.0)
Non-reacting *(range 7-35)*	21.7 (4.5)

RESULTS

Demographic characteristics

In total, 406 (87%) of 467 eligible students completed the online assessment. Of the 61 students refusing to participate, 48 provided data on gender and age, revealing no significant differences between participants and non-participants. Table 1 shows that the vast majority of the students was female (75%) and in a relationship (58%). The percentage of 3% students being of non-Dutch nationality is exactly equal to regional statistics reported by Statistics Netherlands. About half of the students considered themselves religious, mainly Catholic. Missing values analysis showed that 6% of the cases contained missing values and that 2.4% of data were missing.

Prevalence of psychological distress and positive mental health

Overall, 21% of the students reported a level of psychological distress above the cut-off score for psychopathology (table 2). Female students reported a significantly higher mean level of psychological distress than male students. A flourishing mental health was reported by 37.5% of the female students, and 51% of the male students, a non-significant difference after correction for multiple testing. Table 3 shows that psychological distress and positive mental health are not two ends of one continuum but partially overlap. The majority of students with high levels of distress (77%) report a moderate positive mental health and 18% of them reports a flourishing positive mental health.

Table 2 *Psychological distress and positive mental health in participating students*

	Total	Women	Men	*p* value[b]
Psychological distress				
Global severity index, M (SD)	0.39 (0.29)	0.41 (0.29)	0.30 (0.28)	<0.001*
Above cut-off,[a] n (%)	86 (21.2)	72 (23.6)	14 (14.0)	.05
Positive mental health				
Total score, M (SD)	45.7 (10.3)	45.3 (10.1)	46.8 (10.8)	.21
Positive mental health, categories				
Languishing, n (%)	5 (1.3)	4 (1.4)	1 (1.0)	
Moderate, n (%)	225 (57.8)	179 (61.1)	46 (47.9)	.07
Flourishing, n (%)	159 (40.9)	110 (37.5)	49 (51.0)	

a: a cut-off score of 0.58 is advised in Dutch samples to screen for psychopathology
b: in case of skewed/categorised data non-parametric tests were used
*: remained significant after Bonferroni correction for multiple testing 0.05/4= alpha level 0.0125

Table 3 *Positive mental health in medical clerkship students with low and high psychological distress*

	Low distress* (n=307)	High distress (n=82)
Positive mental health, categories		
Languishing mental health, n (%)	1 (0.3)	4 (4.9)
Moderate mental health, n (%)	162 (52.8)	63 (76.8)
Flourishing mental health, n (%)	144 (46.9)	15 (18.3)

* the advised score of 0.58 to screen for psychopathology was used as cut-off to distinguish between low and high distress

Table 4 *Correlations between psychological distress, positive mental health and their possible predictors (n=389)*

	Psychological distress[a]	Positive mental health
Demographic characteristics		
Gender (f/m)	-.23**	.06
Age (yrs)	-.06	-.03
Relationship (n/y)	-.12*	.05
Religious (n/y)	-.01	.07
Nationality (Dutch/other)	.01	-.03
Dysfunctional cognitions		
Worrying	.59**	-.35**
Rigidity	.00	-,02
Need for approval	.39**	-.19**
Emotional irresponsibility	.06	-.14**
Problem avoidance	.26**	-.29**
Mindfulness skills		
Observing	.16**	-.03
Describing	-.23**	.21**
Acting with awareness	-.52**	.32**
Non-judging	-.51**	.29**
Non-reacting	-.19**	.19**

* $p<.05$ ** $p<.01$ a: spearman's rho

Multiple linear regression model of psychological distress

Correlations between psychological distress and the possible predictors are shown in table 4. The final model for predictors of psychological distress is shown in table 5. It contains the three significant predictors that remained after backward elimination of non-significant variables from the model. The mindfulness skill 'acting with awareness' was the strongest inversely correlated predictor for psychological

distress, uniquely explaining 7.1% of total variance. The dysfunctional cognition 'worrying' uniquely explained 6.1% of the variance, making it the strongest positively correlating predictor. The mindfulness skill 'non-judging' made a smaller, but significant contribution uniquely explaining 2.6% of the variance. The final model explained 50% of the total variance in psychological distress.

Table 5 *Multiple linear regression model of psychological distress*

Predictors	Standardized ß	t	Unique variance (%)	*p* value
Acting with awareness	-0.31	-7.4	7.1	<.001
Worrying	0.30	6.8	6.1	<.001
Non-judging	-0.20	-4.5	2.6	<.001
Corrected for:				
Positive mental health	-0.14	-3.4	1.5	<.001
	Total model			
	R^2	*Adj.* R^2	*F*	*P*
	50.0	49.4	95.8	<.001

Multiple linear regression model of positive mental health

Table 4 shows correlations between positive mental health and its possible predictors. The final model for predictors of positive mental health is shown in table 6. It also contains three significant predictors after backward elimination and explains 21.9% of the variance in positive mental health. The dysfunctional cognition 'problem avoidance' is the strongest inversely correlated predictor explaining 3.1% of the variance, followed by 'emotional irresponsibility' explaining 1.6% of the variance and 'worrying' explaining 0.9% of the variance. The highest Variance Inflation Factor score of our variables was 1.5 in the model of psychological distress and 1.6 in the model of positive mental health. In both models this value was well below 10 indicating that multicollinearity was not a problem.

Table 6 *Multiple linear regression model of positive mental health*

Predictors	Standardized ß	t	Unique variance (%)	*p* value
Problem avoidance	-0.19	-3.9	3.1	<.001
External control	-0.13	-2.8	1.6	<.01
Worrying	-0.12	-2.1	0.9	.037
Corrected for:				
Psychological distress	-0.27	-4.8	4.7	<.001
	Total model			
	R^2	*Adj.* R^2	*F*	*P*
	21.9	21.1	26.9	<.001

DISCUSSION

In this study, 21% of students scored above cut-off level for psychopathology and 41% reported a flourishing mental health. The inversely related mindfulness skill 'acting with awareness' was the strongest predictor for psychological distress and for positive mental health the strongest predictor was the dysfunctional cognition 'problem avoidance', also inversely related.

Prevalence of psychological distress and positive mental health

The 21% of medical clerkship students scoring above the cut-off for psychopathology is slightly lower than the 27% of Swedish students entering clinical training (Mini International Neuropsychiatric Interview)[8] and the 25% of Australian students in their clerkships (General Health Questionnaire-28)[11] and substantially lower than the 37% in Iranian clerkship students (General Health Questionnaire-28).[10] It is even less than half the amount of the 48% as reported in the only other Dutch study by Gaspersz and colleagues, who screened for common mental disorders in a sample of preclinical and clinical students with combined response rate of 52%. This finding is in line with the conclusion of Hope and colleagues in their systematic review on depression, anxiety and psychological distress outside North-America, that studies with higher quality and a response rate higher than 80%, in general, find lower rates of psychological distress.

Regarding differences between countries; working environment and responsibilities of students during their clinical clerkships might vary. Also, the threshold that students experience to report symptoms of psychological distress could be influenced by cultural differences. Specifically for American students, one could hypothesize that the high study debt compared to other (European) countries might contribute to the difference in rates of psychopathology. However, scientific literature so far does not show a clear relationship between student level of debt and psychological distress[53] and between debt and positive mental health.[24] Debt was, however, significantly associated with suicidal ideation in the previous year, but not with future suicidal ideation.[54]

The percentage of students reporting a flourishing mental health in our sample was twice as high as the percentage of students scoring above cut-off for psychopathology. Dyrbye and colleagues suggest a flourishing mental health can attenuate consequences of high levels of distress.[24] Students with a mental disorder but with flourishing positive mental health might be less at risk than those with languishing positive mental health. Investigating this further would give more information on which students might be in need of support.

Predictors of psychological distress

The only other study examining predictors of psychological distress specifically in medical clerkship students is a longitudinal Swedish study which explored effects of personality traits and study environment on psychiatric morbidity. Only depressive symptoms at first year remained a significant predictor of psychiatric morbidity at third year when entered in a model with the other potential predictors workload, worries about future competence, financial worries, impulsivity, negative affectivity, performance based self-esteem and disengagement at first year.[8]

The finding that external factors such as workload and financial worries did not significantly predict psychopathology was also reported in studies among medical students from different years: A 1-year prospective longitudinal study in medical students from all six years in two Dutch medical faculties showed that mental health problems were not significantly predicted by exogenous study factors such as study delay, study hours per week, study stressors or having a part-time job but by the personal factors 'worry about health' (risk factor) and 'excessive drinking behavior' (protective factor).[55] This is similar to the results of Bore and colleagues,[56] who examined 20 possible endogenous and exogenous predictors of psychological distress among 127 Australian medical students from year 1 to 5. They found that not gender, demographics, hours studying, paid work or volunteer work were most important, but that emotional resilience was the strongest predictor of psychological distress. Emotional resilience could be described as being emotionally stable, calm and grounded as opposed to emotionally reactive (neurotic). This is in line with our findings that the endogenous factors acting with awareness (negative) and worrying (positive) are stronger predictors of psychological distress than demographic variables.

The only other study, besides ours, examining the relationship between dispositional mindfulness and psychological distress is that of Slonim and colleagues in Australian medical students from year 1 to 5.[38] Similar to our results, they also found the subscales 'acting with awareness' and 'non-judging' to be most strongly associated with lower levels of depression and anxiety. It is interesting that also in other target groups like for example men with advanced prostate cancer,[57] fibromyalgia patients,[58] and a community sample comprising of non-meditators and experienced meditators[59] of all FFMQ subscales 'acting with awareness' and 'non-judging' are strongest associated with lower psychological distress. 'Acting with awareness' refers to a person's ability to focus on present moment experiences. Possibly, a person with a high level of self-awareness is less bothered by ruminative thoughts and more responsive to his own needs, which could decrease psychological distress. It could also be the other way around; a person experiencing a high level of psychological distress might be unable to focus on the present moment experience, therefore being less self-aware.

Predictors of positive mental health

So far, no other studies have examined predictors of positive mental health in medical clerkship students or other medical students. However, there are two Dutch studies in other target groups which have examined predictors of positive mental health. In a sample of 1161 Dutch participants from a representative internet panel between the ages of 18 and 88, agreeableness and extraversion were uniquely related to positive mental health whereas emotional instability was uniquely related to psychological distress.[60] Agreeableness (being warm, empathic and friendly) and extraversion (being outgoing, social) are both aspects which are important in interpersonal relationships, an important aspect of positive mental health. The second Dutch study was a randomized controlled trial (n=93) which showed that Acceptance and Commitment Therapy improved positive mental health of participants and that psychological flexibility during the intervention mediated the effects.[61] That psychological flexibility, the ability to accept aversive internal experiences, is related to positive mental health seems similar to our finding that 'problem avoidance' and 'emotional irresponsibility' are its inversely related predictors. Coping with problems in an active way and maintaining an internal locus of control seem to improve positive mental health. Again this could also be the other way around; students with high positive mental health might be better able to approach problems in an active way and remain in control.

Above findings are in line with the definition of health as 'the ability to adapt and to self-manage'. An approaching coping style can be seen as a healthy way to adapt to a new situation and self-management relates to the locus of control of students. Clinical clerkships are eminently a period in which students are confronted with complex situations, insecurity, and suffering, which requires the ability to adapt and self-manage to remain a healthy professional. Furthermore, the fact that psychological distress and positive mental health share the two predictors 'acting with awareness' and 'worrying', but also have a few separate predictors is supportive for the hypothesis that they are related, but distinct concepts and not two ends of the same continuum.

Strengths and limitations

Although it is also reported in other studies that the explained variance by personality traits is higher in psychopathology than in positive mental health,[60] the fact that only 21% of variance in positive mental health was explained by our predictors compared to 50% of variance in psychological distress could mean that we did not manage to find the most important predictors of positive mental health yet. In light of the definition of Huber and colleagues it would be interesting to investigate the relationship between positive mental health and resilience, which is defined as 'positive adaptation despite experiences of significant adversity or trauma.' This

might be more relevant to clinical clerkships than the dysfunctional cognitions that we used in our current study. Our study is cross-sectional in nature, therefore we cannot make any assumptions on causality. Also, we performed our study in one university medical center, which could limit the generalizability of results. Strengths of our study are the high response rate (87%) and medium-large sample size.

CONCLUSION

The prevalence of psychopathology in our sample of Dutch medical clerkship students is slightly higher than in the general population. Although no conclusion on causality can be drawn, this study supports the idea that self-awareness and active, nonavoidant coping strategies are related to lower distress and higher positive mental health. Supporting the development of these skills might contribute to student well-being. The combination of levels of psychological distress and positive mental health might also be a better indicator of which students are in need of support than levels of psychological distress alone. More longitudinal research needs to be done to investigate these hypotheses.

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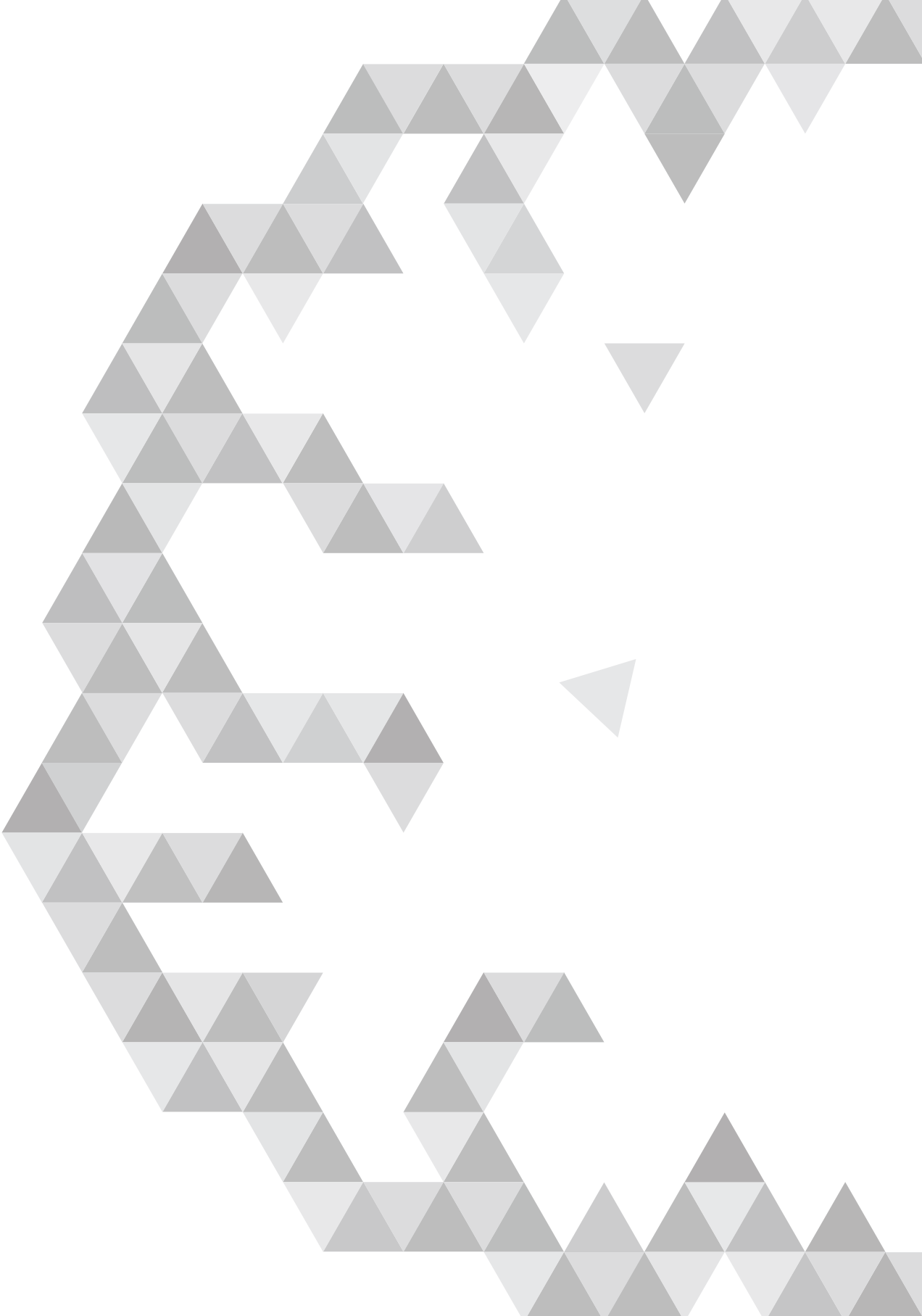

3

Mindfulness training for medical students in their clinical clerkships: two cross-sectional studies exploring interest and participation

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BMC Medical Education, 2015

ABSTRACT

Background

So far, studies investigating Mindfulness Based Stress Reduction (MBSR) training in medical students are conducted in self-selected, preclinical samples, with modest response rates without collecting data on non-participants. This study first examines interest and participation rates of students starting their clinical clerkships. Second, it compares students interested in a mindfulness training with non-interested students and students participating in a trial on the effect of MBSR with non-participating students on levels of psychological distress, personality traits, dysfunctional cognitions and mindfulness skills.

Methods

Study 1: From March to December 2010 we performed a cross-sectional pilot-study among fourth-year medical students starting their clinical clerkships, assessing interest in a MBSR training. We compared scores on the Brief Symptom Inventory, the Neo Five Factor Inventory and the Five Facet Mindfulness Questionnaire of interested students with those of non-interested students using t-tests with Bonferroni correction.

Study 2: From February 2011 to August 2012 we invited fourth-year medical students starting their clinical clerkships to participate in a randomized controlled trial (RCT) on the effectiveness of MBSR. We compared scores on the Brief Symptom Inventory, the Irrational Beliefs Inventory and the Five Facet Mindfulness Questionnaire of participating students with those of non-participants using t-tests with Bonferroni correction.

Results

Study 1: Ninety-five out of 179 participating students (53%) were interested in a MBSR training. Interested students scored significantly higher on psychological distress (p=.004) and neuroticism (p<.001), than 84 non-interested students. Study 2: Of 232 eligible students, 167 (72%) participated in our RCT. Participants scored significantly higher on psychological distress (p=.001), worrying (p=.002), problem avoidance (p=.005) and lower on mindfulness skills (p=.002) than 41 non-participants.

Conclusion

Interest in mindfulness training and response rates in a RCT on the effectiveness of MBSR among clinical clerkship students are equal to (study 1) or higher (study 2) than in studies on preclinical students. Interested students and participants in a RCT reported more psychological distress and psychopathology related character traits. Participants scored lower on mindfulness skills.

INTRODUCTION

As opposed to medical school being an inspiring environment to practice skills and develop a professional attitude, high workload and personal demands can change it into a stressful period. Medical students already report symptoms of psychological distress and burnout before graduating from medical school. They experience more psychological distress than age matched peers, with up to almost 50% reporting burnout related complaints.[1,2] The scientific literature reports an increase of psychological distress[3,4] and a decrease of self-reported empathy[5,6] and life satisfaction[7] during medical school. This is relevant for clinical practice, because stress during medical school seems to be predictive for a lower work satisfaction and more work related problems after graduation.[8,9] Physician distress contributes to a lower quality of patient care[10-12] and patient satisfaction.[13-15] As prevention is better than cure, there is a large potential benefit in teaching medical students how to learn resilience attitudes such as self-awareness of stress signals and unhelpful automatic responses.[16]

An intervention that is currently upcoming for healthcare professionals to enhance their resilience attitudes and to reduce stress is Mindfulness Based Stress Reduction (MBSR) training. MBSR is an 8-week group training of 2.5 hours a week in which participants learn to focus their attention on the present moment by means of various exercises like meditation, psycho-education and practice integrated in daily activities. They are encouraged to change unhelpful automatic patterns, enhance self-care and adopt a non-judging attitude. MBSR was originally developed to support patients suffering from chronic pain,[17] but is currently offered to a broad public, existing of patients as well as healthy individuals. Meta-analyses of the effectiveness of MBSR in a variety of target groups, show medium effect sizes.[18-20] For professional practice in patient care, mindfulness training facilitates self-compassion, curiosity, self-reflection and a beginner's mind that is open to new approaches.[21-25] Awareness of perfectionism and recognising a 'helping and fixing mode' are thought to contribute to the underlying process of change in healthcare workers.[24]

Looking more specifically at cohort controlled and randomized controlled studies in medical students, six studies have been conducted so far.[26-31] Five with modest response rates varying from 18 to 40%, or unknown[28] and one study allocating a random group of students to the intervention or control condition before inviting them to participate in the trial, resulting in a response rate of 72%.[31] Three out of six strongly reduced the duration of the MBSR intervention[28-30] or used combined groups of medical students and nursing students[28] or psychology students.[30] The

three remaining studies, a randomized controlled trial of Shapiro and colleagues[26] and Erogul and colleagues[31] and a prospective, cohort controlled study of Rosenzweig and colleagues[27] used interventions closer to the classical MBSR training, targeting medical students only. All three showed positive results: students significantly improved in mood,[27] psychological distress,[26,31] self-compassion[31] and empathy.[26] In none of the above six studies, data were collected on non-participants and all studies concerned medical students in their preclinical phase.

In a recent paper summarising mindfulness based interventions in medical students, Dobkin and Hutchinson[32] conclude that although the evidence points to the usefulness of teaching mindful practices, various issues regarding timing, format and integration in the curriculum remain to be considered. In the present study, we aim to contribute to the existing knowledge by further exploring two questions raised by the above results from literature:

1. *Given the modest response percentages in preclinical medical students, how would interest in MBSR and participation in a RCT on the effectiveness of MBSR be among medical clerkship students?*
   Clinical clerkships might be the time that the need for support is highest among students and the time that offers many opportunities to integrate exercises from the training in daily activities. Despite this, we expect interest in participation in a MBSR training to be lower among medical clerkship students than among students in preclinical phase, because medical clerkship students experience a higher workload and lower amount of leisure time. This might withhold them from applying for a training.

2. *Which medical students do we reach by offering a training?*
   It is often suggested that, when making use of self-selected sampling, those who are more distressed will be more likely to apply for stress reducing interventions. Although this might seem logical, from current literature we do not have any information on characteristics of medical students interested in MBSR versus non-interested students or of medical students participating in a RCT versus non-participants. It could also be the case that students with higher amounts of psychological distress, feel unable to invest any extra time in a training or might be ashamed to participate. To answer this question, we will compare levels of psychological distress, personality traits and mindfulness skills in interested students to those of non-interested students and also in participants in a RCT investigating the effect of MBSR to those of non-participants.

METHODS

Design, participants and procedure

We used two different student samples to answer our research questions. First, we performed a pilot study (study 1), a cross-sectional survey to examine interest in participation in a mindfulness training as part of exploring the feasibility of a RCT on the effect of MBSR in medical students in their clinical phase. We compared interested students to non-interested students on levels of psychological distress, personality traits and mindfulness skills. Second, we invited students to participate in the above mentioned RCT and collected baseline data on participants as well as non-participants (study 2).

Study 1

We performed a cross-sectional survey from March to December 2010 among all fourth-year medical students of the Radboud University Medical Center, Nijmegen at the start of their clinical clerkships. We offered students an interactive lecture on mindfulness-based interventions, which focused on current scientific literature on mindfulness-based interventions in psychiatry and included a guided mindfulness practice (bodyscan) and enquiry. The lecture was integrated in the core medical curriculum as part of the preparation period for their psychiatry clerkship, one of the first clerkships. It was presented by an experienced psychiatrist and mindfulness trainer. After the lecture students were asked if they were willing to complete a set of questionnaires on psychological distress, personality traits and mindfulness skills. As part of the questionnaire, they were asked if they would be interested in participating in a full eight-week MBSR training in case this would be offered to them in the near future. Students could receive feedback on their individual scores on the questionnaire, if they wanted to.

Study 2

From February 2011 to August 2012 we invited fourth-year medical students at the start of their clerkships to participate in an RCT on the effectiveness of MBSR on psychological distress, aspects of well-being and aspects of professionalism. Information about the trial was provided after a lecture on physician well-being as part of the core medical curriculum. If students were interested in participation in the trial, they received an information letter by e-mail, giving them time to individually reconsider participation at home. Non-participants were asked if they would be willing to complete a one-time assessment, similar to the baseline assessment of trial participants. We collected information from participants and non-participants by means of an online survey, which students could access at home with a personalized link. Both participants and non-participants gave informed consent

before completing the survey.
The MBSR training we offered was based on the classical training as developed by Kabat-Zinn and colleagues[17] using an 8-week face-to-face program with formal exercises like a bodyscan, meditation and yoga next to informal practice to cultivate self-awareness.

Measures

Study 1
The set of questionnaires that students completed in study 1 included the following measures:

Brief Symptom Inventory (BSI)
The BSI is a 53-item questionnaire, measuring psychological symptoms of distress in both clinical and non-clinical populations. It was developed as a short form of the 90 item Symptom Check List (SCL-90).[33] A five point Likert scale is used to score items from 'none-at-all' to 'extremely'. In our study, we used the global severity index (GSI). This is the mean score of all 53 items and is commonly used as a measure for overall psychological distress. The Dutch BSI has been found to have a high reliability and high validity.[34,35]

Neo Five Factor Inventory (NEO-FFI):
The NEO-FFI measures five personality domains; neuroticism, extraversion, agreeableness, conscientiousness, and openness to experience. The NEO-FFI comprises 60 items, 12 for each domain. The internal consistency of the Dutch NEO-FFI was found to be acceptable to good on all domains (.64 to .88). The six month test-retest reliability and the construct validity are satisfactory.[36]

Five Facet Mindfulness Questionnaire (FFMQ):
With the 39-item FFMQ five domains of mindfulness skills are assessed: observing, describing, acting with awareness, non-judging of inner experience and non-reactivity to inner experience.[37] Adding up the domains results in a total score of mindfulness skills. Items are rated on a 5-point Likert-type scale from 'never or very rarely true' to 'very often or always true'. The subscales of the Dutch FFMQ have been shown to have good internal consistencies.[38]

Study 2
In study 2, in addition to the FFMQ and BSI, we used the Irrational Beliefs Inventory (IBI) instead of the NEO-FFI. We expect the NEO-FFI to measure 'trait' personality characteristics, being rather stable over time. As the baseline measurement of study

2 is part of a longitudinal intervention study, we wanted to measure personality characteristics that we expect to be more reactive to change over time than those measured by the NEO-FFI. Therefore, we chose to use the Irrational Beliefs Inventory which measures dysfunctional cognitions instead.

Irrational Beliefs Inventory (IBI)
We used the five subscales of the 50-item IBI to assess students' irrational cognitions, which are considered to be related to a person's vulnerability for developing psychopathology.[39] The IBI is derived from the Irrational Beliefs Tests[40] and the Rational Behavior Inventory[41] but with improved psychometric quality. The subscales are worrying, rigidity, need for approval, problem avoidance and emotional irresponsibility. They are rated on a 5 point Likert scale from 'strongly disagree' to 'strongly agree'. Reliability of the subscales and total scale was satisfactory (Cronbach's alpha 0.70-0.85).[42]

Statistical analysis

All data of study 1 were collected and anonymized in Microsoft Access and exported to IBM SPSS statistics 20.0. We collected data of study 2 using an online survey tool (Limesurvey) and exported them to IBM SPSS statistics 20.0 for anonymous analysis. The use of an online survey tool resulted in very few missing data. Missing data analyses revealed that they were missing completely at random (MCAR), therefore we did not use any imputation method. We used independent sample t-tests to compare mean scores between students interested in a mindfulness training and non-interested students (study 1) and between students participating in our trial and non-participants (study 2). We used Kolmogorov-Smirnov tests and visual inspection (Q-Q plots, histograms) to assess normality. If data were not meeting normality assumptions, we used non-parametric Mann–Whitney U tests. All statistical tests were performed two sided using an alpha of 0.05. We applied a Bonferroni-correction to correct for multiple testing and prevent excessive type I errors. Where possible, the magnitude of differences between compared groups was computed as standardized effect size measure (Cohen's *d*). We considered values of 0.2 small, 0.5 medium and 0.8 large.[43]

Ethical considerations

In consultation with the ethical committee of the Radboud University Medical Center, study 1 was exempt from full ethical assessment because of limited effort asked from students. As part of a randomized controlled trial, data collection of Study 2 was fully assessed and approved of by the ethical committee of the Radboud University Nijmegen Medical Center, protocol registration nr. 2010/388 and ABR nr.: NL33969.091.10.

Figure 1 *Flowchart describing recruitment and participation of study 1*

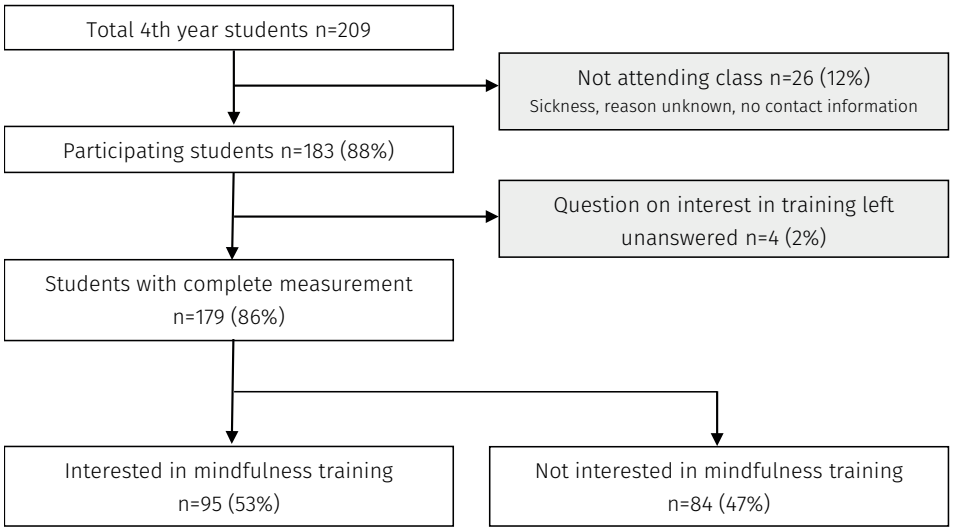
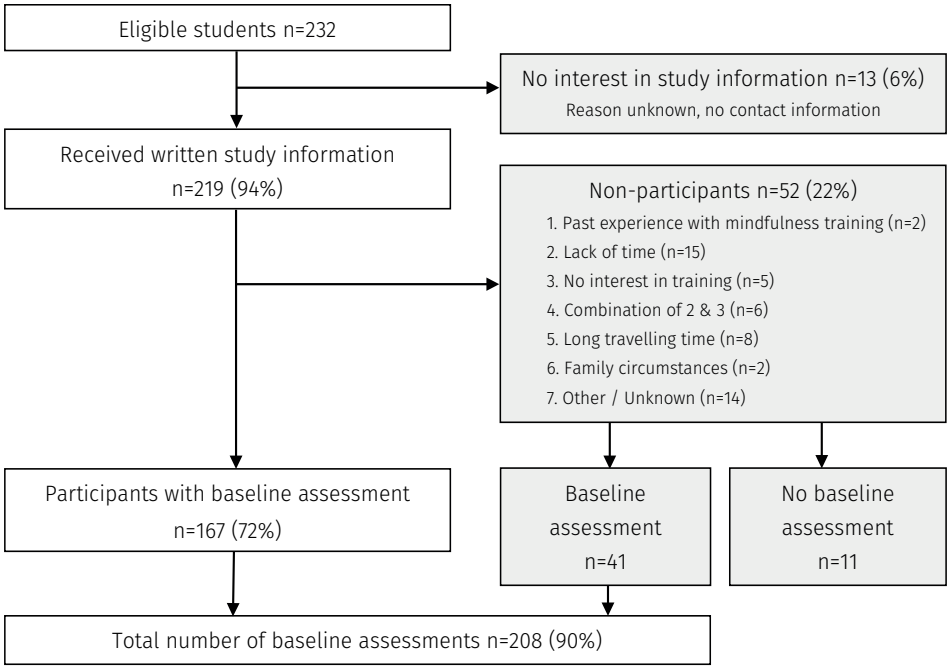


Figure 2 *Flowchart describing recruitment and participation of study 2*



RESULTS

Study 1

Interest in MBSR and comparison of interested with non-interested students
Of all 209 fourth-year students, 179 (86%) completed the questionnaires of whom 95 (53%) were interested in following a MBSR training in case this would be offered to them in the near future (Figure 1). There were no significant differences in mean age and gender between the 95 interested and 84 non interested students. However, interested students reported higher levels of psychological distress, neuroticism and agreeableness (Table 1). After correcting for multiple testing (alpha level 0.05/9=0.0056) only the differences on psychological distress (p=.004) and neuroticism (p<.001) remained significant.

Table 1 *Comparison of students interested and not interested in a MBSR training*

	Total group (n=179)	Interested in MFN (n=95)	Not interested in MFN (n=84)	Mean diff. [95% CI]	p[a]	d
Demographic characteristics:						
Age, median years	22.0	22.0	22.0[b]		.17	
Female sex, n (%)	120 (66%)	66 (69.5%)	51 (61.4%)[c]		.26	
Psychological distress, median[d]	0.23	0.26	0.19		.004*	
Personality traits, mean scores (SD):						
Neuroticism *(range 12–60)*	28.9 (8.4)	30.9 (7.9)	26.6 (8.4)	4.2 [1.8;6.6]	<.001*	0.52
Extraversion *(range 12–60)*	43.9 (6.5)	43.5 (6.2)	44.3 (6.8)	−0.85 [−2.8;1.1]	.39	0.13
Openness to experience *(range 12–60)*	38.9 (5.1)	39.4 (5.3)	38.4 (4.8)	1.0 [−0.50;2.5]	.19	0.20
Agreeableness *(range 12–60)*	46.0 (4.7)	46.7 (4.8)	45.2 (5.5)	1.5 [0.12;2.9]	.03	0.29
Conscientiousness *(range 12–60)*	44.0 (6.0)	43.5 (6.0)	44.5 (6.0)	−1.0 [−2.8;0.77]	.27	0.17
Mindfulness skills, mean score (SD)						
Total *(range 39–195)*	132.3 (13.0)	131.1 (13.4)	133.7 (12.5)[b]	−2.7 [−6.5;1.2]	.18	0.20

a: alpha level after Bonferroni correction 0.05/9 = 0.0056.
b: information not available for 2 students.
c: information not available for 1 student.
d: the median is reported because of skewed data and use of non-parametric test.
* statistically significant after correcting for multiple testing, p < 0.0056.

Study 2

Participation in a trial on the effect of MBSR and comparison of baseline measurements of participants to non-participants

Of 232 eligible students, 167 (72%) students participated in the RCT, knowing that they could be randomized to receive the mindfulness training. Of 52 students who did not want to participate in the trial, 41 (79%) were willing to complete a one-time baseline assessment (Figure 2), which resulted in a total 208 of baseline measurements (90%). Comparing participants with non-participants, we found no differences in age and gender. However, after applying a Bonferroni correction for multiple testing, participants still reported significantly more psychological distress (p=.001), worrying (p=.002) and problem avoidance (p=.005) and less total mindfulness skills (p= .002) than non-participants (Table 2).

Table 2 *Comparison of students interested and not interested in MBSR training*

	Total group (n = 208)	Participants (n = 167)	Non participants (n = 41)	Mean difference [95% CI]	p[a]	d
Demographic characteristics:						
Age, median years[b]	23.0	23.0	23.2[c]		.92	
Female sex, n (%)	160 (76.9%)	131 (78.4%)	29 (70.7%)		.31	
Psychological distress, median[b]	0.32	0.36	0.21[c]		.001*	
Dysfunctional cognitions, mean/median scores (SD):						
Worrying *(range 12–60)*[b]	34.0	35.0	29.0[d]		.002*	
Rigidity *(range 14–70)*	36.2 (5.6)	35.9 (5.6)	37.4 (5.4)[d]	−1.5 [−3.5;0.52]	.15	0.27
Need for approval *(range 7-35)*	23.5 (4.1)	23.7 (4.2)	22.8 (3.9)[d]	0.93 [−0.54;2.4]	.21	0.23
Emotional irresponsibility *(range 7-35)*	22.1 (3.7)	22.0 (3.8)	22.5 (3.3)[d]	-0.54[−1.9;0.78]	.42	0.15
Problem avoidance *(range 10–50)*	23.5 (5.2)	23.9 (5.3)	21.3 (4.1)[d]	2.7 [0.83;4.5]	.005*	0.56
Mindfulness skills, total mean score (SD)						
Total *(range 39–195)*	131.3 (14.5)	129.8 (14.6)	137.7 (12.5)[e]	−7.9 [−13.0;-2.9]	.002*	0.58

a: alpha level after Bonferroni correction 0.05/9 = 0.0056
b: the median is reported because of skewed data and use of non-parametric test
c: information not available for 1 student
d: information not available for 4 students
e: information not available for 3 students
*: statistically significant after correcting for multiple testing, p < 0.0056.

DISCUSSION

In study 1, we found that 53% of students were interested in participating in a MBSR course. Interested students reported significantly higher levels of psychological distress and neuroticism, a measure of emotional instability, than non-interested students. As neuroticism is one of the key character traits in making people vulnerable to developing psychopathology such as anxiety, depression and burnout,[36,44] it correlates with levels of psychological distress, therefore it is in line with current literature that neuroticism also differs between the groups. In study 2, 72% of students participated in a randomized controlled trial of MBSR. Participants of the trial reported significantly more psychological distress, worrying and problem avoidance than non-participants. Worrying and problem avoidance both correlate positively with psychopathology and neuroticism, thus making people vulnerable for psychological distress.[42] Furthermore, we found that participants reported less total mindfulness skills than non-participants which, assuming that students participating in a MBSR training will increase their level of mindfulness skills, seems to confirm that we reach those students who need it most, those with higher distress and lower skills.

Interest in a mindfulness training

The 53% students interested in a mindfulness training at the start of their clinical clerkships (study 1) is higher than we expected based on the modest response percentages in preclinical students so far. Even if we would assume the worst case scenario that the 26 students who did not attend the lecture on mindfulness were all absent because they were not interested in the subject, the rate of interested students would still be 45%. The largest limitation of study 1 is, of course, that these students were only *asked* if they would be interested in following a training, so we do not know how many would have truly participated.

Looking at the results of study 2, the response percentage of participants in the trial (72%) is not only high compared to existing studies in preclinical students, but also to the percentage of interested students in study 1. Possibly, compared to preclinical students, experiences from their clerkships made students in their clinical phase more aware of the risks of psychological distress in their future residencies and of their own response to the high workloads. It at least does not seem the case that clerkships withheld them from participation. A number of other factors could have contributed to the difference between the interest rate and participation rate in study 1 and 2:

First, part of the students might have participated because they think it is important to support research in general, not because they wanted to participate specifically in

a MBSR. Second, students in study 1 and 2 were introduced to the study in different ways; the introduction in study 2 was more theoretical and students knew that they would have 50% chance to be randomized to receive the training. Third, it could be that students who would not have actively applied to follow a mindfulness training as elective course, did apply for participation in the trial because it was easily accessible or because they were just curious. And last, maybe part of the students favoured the 50% chance of following the regular curriculum instead of receiving the training, but took the risk of participation anyway. Still, taking all these factors in consideration, the response percentage remains high, which implies that even though medical clerkship students are more busy, they also might be more in need of support than preclinical students. The high response rate also suggests that integration in the core curriculum could be feasible instead of offering an elective training.

Interested versus non-interested and participants versus non-participants

Students interested in a training (study 1) and students participating in a trial (study 2) reported higher levels of psychological distress, neuroticism (study 1) and worrying (study 2) than non-interested and non-participating students. Both neuroticism and worrying make people more prone to developing psychopathology. This implies that we probably reach those who could potentially benefit most from the training.

Interestingly, the levels of psychological distress found in study 2 were higher than in study 1, even though the baseline assessments were conducted during the same period in medical curriculum at the start of clinical clerkships. Also, total mindfulness skills in study 2 differed significantly between participants and non-participants, which was not the case in study 1 between interested and non-interested students. These findings could possibly be explained by the fact that in study 1, students received an interactive lecture on mindfulness before completing the questionnaire, including a guided mindfulness practice (bodyscan) of 45 minutes. This could have lowered 'state' psychological distress and have influenced the score on mindfulness skills reported by the students.

Another explanation to this difference could be found in the gender sensitivity of the instruments used. In general, women report higher levels of psychological distress and neuroticism than men. As the percentage of women in study 2 (77%) was higher than in study 1 (66%) this might have contributed to more pronounced differences between participants and non-participants in both studies. However, it should be noted that although our findings are statistically significant, the absolute differences are small and need further study to see if they are clinically relevant.

Strengths and limitations

As far as we know, our study is the first to actively gather information on non-

interested and non-participating students in the start of their clinical clerkships. Response rates were high in both study 1 (86%) and study 2 (baseline measurements of 90% of students), which contributes to the validity of our data. Furthermore, in study 2 we used an online survey program, which allowed students to complete the questionnaires at home in private, decreasing the risk of social desirable answers. A limitation of both studies is that they took place at only one medical center in the Netherlands. We do not know whether results are generalizable to other medical schools. In addition, in study 1, students completed the questionnaire in a classroom, which could have led to social desirable answers possibly resulting in an underestimation of the level of psychological distress.

CONCLUSION

In conclusion, interest and participation rates in medical clerkship students were higher than found in current literature on preclinical students. This finding implies that the training could also be given during clerkships, possibly even resulting in better opportunities of integrating the exercises in hospital daily practice. Although our study seems to indicate that by offering the mindfulness training in regular medical curriculum we attract those students who could benefit most, those with higher levels of psychological distress and lower levels of mindfulness skills, it is still unclear what is the clinical relevance of this finding, as we did not use any outcome measures related to professional behavior of students. This will have to be examined further in the future.

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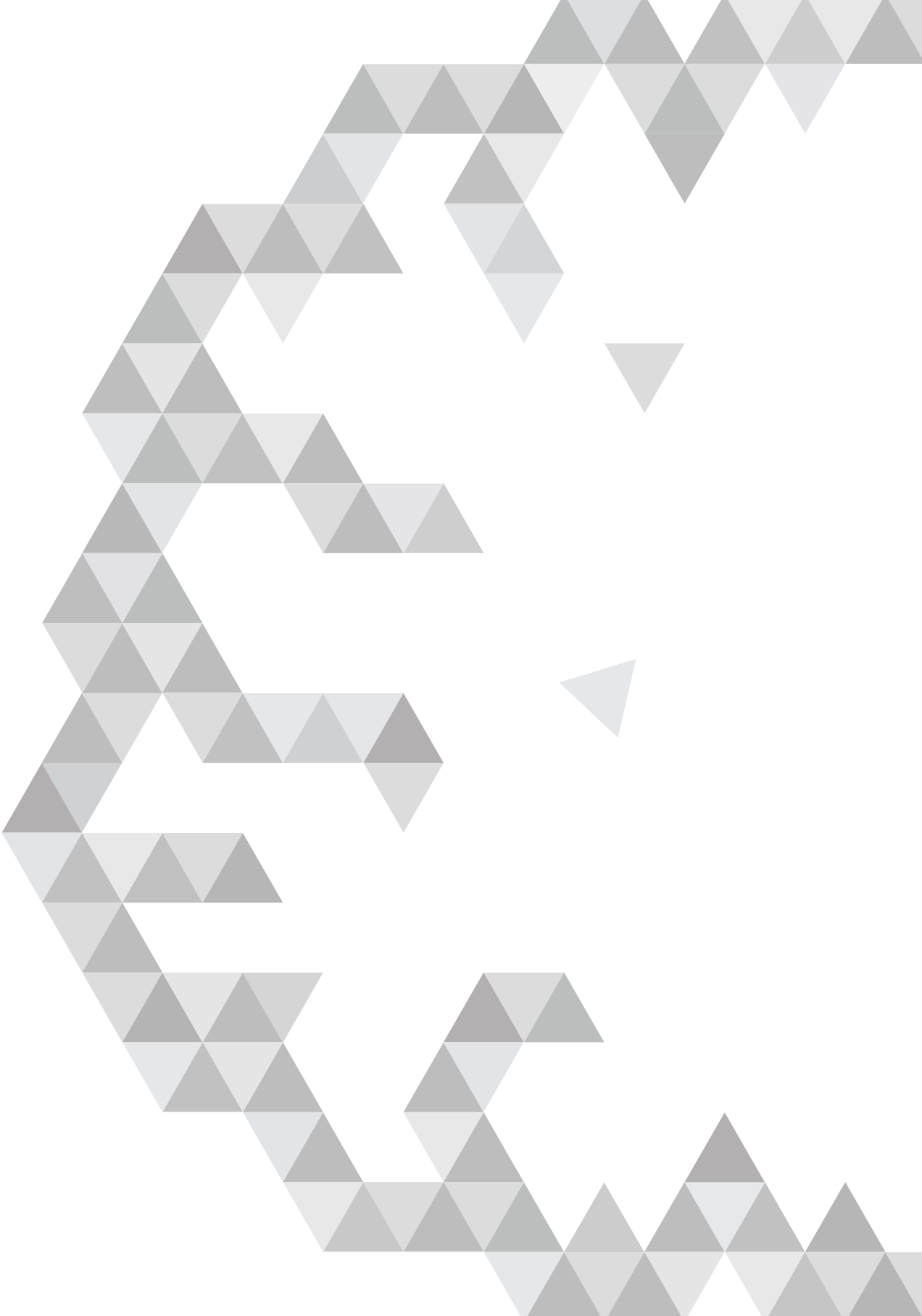

4

Effects of mindfulness-based stress reduction on the mental health of clinical clerkship students: A cluster-randomized controlled trial

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Academic Medicine, 2017

ABSTRACT

Purpose

To examine the effect of mindfulness-based stress reduction training (MBSR) on the mental health of medical students during clinical clerkships.

Method

Between February 2011 and May 2014, the authors conducted a cluster-randomized controlled trial of clerkships as usual (CAU) and clerkships with additional MBSR in medical students during their first year of clinical clerkships at a Dutch university medical center. MBSR consisted of eight weekly two-hour sessions, comprising didactic teaching, meditation exercises, and group dialogues. Students completed online assessments at baseline and after 3, 7, 12, 15, and 20 months. Outcome measures were psychological distress, positive mental health, life satisfaction, physician empathy, mindfulness skills, and dysfunctional cognitions as measured by validated tools.

Results

Of 232 eligible students, 167 students (72%) participated and were randomized by clerkship group into MBSR (n=83) or CAU (n=84). The MBSR group reported a small reduction of psychological distress (p=.03, Cohen's d=0.20) and dysfunctional cognitions (p=.05, Cohen's d=0.18) and a moderate increase of positive mental health (p=.002, Cohen's d=0.44), life satisfaction (p=.01, Cohen's d=0.51), and mindfulness skills (p=.05, Cohen's d=0.35) compared with CAU during the 20-month follow-up. The authors detected no significant effect on self-reported physician empathy (p=.18, Cohen's d=0.27).

Conclusion

MBSR appeared feasible and acceptable to medical clerkship students and resulted in a small to moderate improvement of mental health compared with CAU over the 20-month follow-up.

INTRODUCTION

Most medical students begin to experience the full effect of their future profession for the first time during their clinical clerkships. These senior years of medical school, in which students rotate through different medical specialties, can be stressful because of the high workload and professional socialization process.[1,2] Levels of overall psychological distress among U.S. and Canadian medical students are higher than in the general population and age-matched peers.[3] Prevalence rates outside these two nations vary widely (12%–97%), and higher-quality studies report lower prevalences.[4]

Compared with psychological distress, there is a paucity of literature on positive mental health in medical students, although Dyrbye and colleagues suggest that positive mental health attenuates some adverse consequences of burnout.[5] According to Ryff and Keyes,[6] positive mental health consists of the six dimensions of psychological well-being: self-acceptance, positive relationships, autonomy, ability to master one's environment, purpose in life, and personal growth. In later research, Keyes[7] added aspects of emotional and social well-being to these dimensions. Keyes[7,8] has shown repeatedly that positive mental health is not just the opposite of psychological distress but is actually an independent contributor to psychosocial functioning over and above psychological distress.

A possible intervention to reduce distress and increase positive mental health is mindfulness-based stress reduction training (MBSR), an eight-week group training program that teaches participants to be aware of bodily sensations, thoughts, and emotions in a curious, non-judgmental attitude.[9] Effects of MBSR on preclinical medical students have previously been examined by Shapiro and colleagues,[10] who conducted a randomized waitlist controlled trial. Compared with the control group (n=36), students who chose MBSR as an enrichment elective (n=37) reported a significant reduction in depression, in both state and trait anxiety, and in psychological distress, plus a significant increase in empathy and spirituality.[10] Authors of a second, nonrandomized, cohort-controlled study found a significant reduction in psychological distress in students who chose to participate in a 10-week MBSR seminar (n=140) in comparison with those participating in a seminar on complementary medicine (n=160).[11] In both studies, the participants were self-selected, the response rates were modest, and the authors did not report follow-up data. A more recent randomized controlled trial conducted by Erogul and colleagues[12] has reported less perceived stress and more self-compassion in students participating in MBSR (n=30) than those allocated to the control group (n=28); however, after six months, only the difference in self-compassion continued.

Two studies have focused on the effect of mindfulness on medical clerkship students. Garneau and colleagues[13] described a significant reduction in depression, emotional exhaustion, and perceived stress and a significant increase in self-compassion and mindfulness after a four-week mindfulness elective (n=58); however, this study lacked both a control group and a follow-up. A set of investigators conducting a randomized controlled trial comparing the eight-week use of a 30-minute, CD-based mindfulness exercise with treatment as usual demonstrated a reduction of perceived stress, which was maintained at eight weeks post intervention.[14] So far, to our knowledge, no authors have reported the effectiveness, including the long-term effectiveness, of the classical eight-week MBSR integrated into clinical clerkships.[15–18]

In their survey of 14 medical schools offering mindfulness training, Dobkin and Hutchinson[17] reported that although such training might be useful, issues regarding timing, format, and long-term effect remained unresolved. In our current study, we have addressed some of these issues by examining the effects of MBSR on both psychological distress and positive mental health, by integrating the intervention into the existing curriculum, and by including long-term follow-up. We hypothesized that MBSR would reduce psychological distress and improve the positive mental health of medical clerkship students.

METHOD

Design and setting

We conducted a cluster-randomized controlled trial of MBSR during clinical clerkships versus clinical clerkships as usual (CAU) in first-year medical clerkship students (who are similar to late second- or early third-year U.S. or Canadian students) of the Radboud University Medical Center in Nijmegen, the Netherlands (Figure 1). Recruitment took place between February 2011 and August 2012, and follow-up assessments lasted until May 2014. The medical curriculum in Nijmegen consists of three years of preclinical bachelor study and three years of master study, which involve rotating through a fixed order of hospital placements alternated with short periods of didactic classroom teaching.

We informed the students about the trial during classroom teaching in the fifth month of their clerkships. Interested students left their e-mail address and received an information leaflet by e-mail within two days, thus enabling them to decide to participate (or not) outside of the teaching environment free of any external pressure. Students did not receive any incentives for participation. Students unwilling to participate indicated their lack of interest by not leaving their e-mail address at the time of invitation, by not replying to the e-mail with the information

leaflet, or by stating that they were not interested in participation in their reply to the invitation e-mail. We asked non-participants if they would be willing to complete the baseline assessment for the sake of assessing possible selection bias. After providing informed consent, the students willing to participate in the trial completed an online baseline assessment, and we sent links to follow-up assessments 3, 7, 12, 15, and 20 months after baseline, during periods of didactic classroom teaching. We purposefully sent these assessments between (not during) clerkships to avoid variations in measures due to the nature of the clerkship. We did not inform instructors and supervisors of subsequent placements about student participation in the study, to preclude students from different groups being treated differently. The medical ethical research committee of Arnhem-Nijmegen approved the trial.

Participants

During the recruitment period, between February 2011 and August 2012, 232 students from 18 clerkship groups started their neurology clerkships in Nijmegen (where the MBSR was taught) and were eligible to participate in the study. Exclusion criteria were as follows:

(1) under 18 years of age;
(2) non–Dutch speaking; and
(3) previous participation in MBSR.

Randomization

One of us (the coordinating researcher, I.v.D.) was responsible for randomizing the groups by means of a computer-generated number every six months during the inclusion period. For the sake of feasibility and to integrate the intervention in the existing curriculum, we cluster-randomized students by their clerkship groups. The Faculty of Medicine determines the composition of groups (and, as a result, the timing of when students start their clerkships) based on a random allocation system which is not related to student performance. We did not inform students of their allocation to either the MBSR or CAU study group until all participants in each clerkship group had completed the online baseline assessment.

MBSR

The intervention for the MBSR group consisted of eight weekly two-hour sessions (4:30 to 6:30 PM) which took place during the classroom teaching period (n=2), the neurology clerkship (n=4), and the psychiatry clerkship (n=2). Appendix 1 provides a detailed description of the intervention, including Home Practice, and its similarities with and differences from the original MBSR. The MBSR was taught by a psychiatrist (A.E.M.S.) and a physician. Both teachers met the standards for UK good practice guidelines for teaching mindfulness-based courses[19] and were not otherwise involved in the medical curriculum.

Outcome measures

We measured the following mental health outcome measures using validated tools (see below): psychological distress (our primary outcome measure), positive mental health, life satisfaction, physician empathy, mindfulness skills, and dysfunctional cognitions. Students completed all the tools described below online.

Brief Symptom Inventory (BSI)

The BSI is a 53-item questionnaire that measures psychological distress in both clinical and non-clinical populations on a five-point Likert-type scale that ranges from 0="none at all" to 4="extremely."[20] The BSI is composed of nine primary symptom dimensions (somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism), which can be summarized in three global indices of distress (overall psychological distress level, intensity of symptoms, and number of symptoms). In this study, we have used the overall psychological distress level (Global Severity Index) as our outcome measure, which is the mean score of all 53 items. A higher score indicates a higher level of psychological distress.[20] The Dutch BSI has been found to have a high reliability (α=0.96) and high validity.[21]

Mental Health Continuum-Short Form (MHC-SF).

The 14-item MHC-SF measures emotional, psychological, and social well-being by means of questions such as "During the past month, how often did you feel that you liked most parts of your personality?" and "During the past month, how often did you feel that you had warm and trusting relationships with others?" Items are scored on a six-point Likert-type scale that ranges from 0="never" to 5="daily" (the total score can range from 0 to 70).[7,8] A higher score indicates higher positive mental health. Studied in a representative sample of the Dutch population, internal reliability of the full MHC-SF has been high (α=0.89) and validity good.[22]

Life Satisfaction Questionnaire (LiSat-9)

The LiSat-9 comprises a single item assessing overall life satisfaction and eight additional domain-specific items all scored on a six-point Likert-type scale, ranging from 1="very dissatisfied" to 6="very satisfied." A higher score indicates a higher level of life satisfaction. The Dutch translation is used in healthy adults as well as different patient populations, mainly in rehabilitation. Studies using the LiSat-9 in different Dutch samples of rehabilitation patients have shown good validity and moderate to good reliability (α=0.74–0.75).[23–26]

Jefferson Scale of Physician Empathy (JSPE)

The 20-item JSPE measures empathy in the physician–patient relationship. It

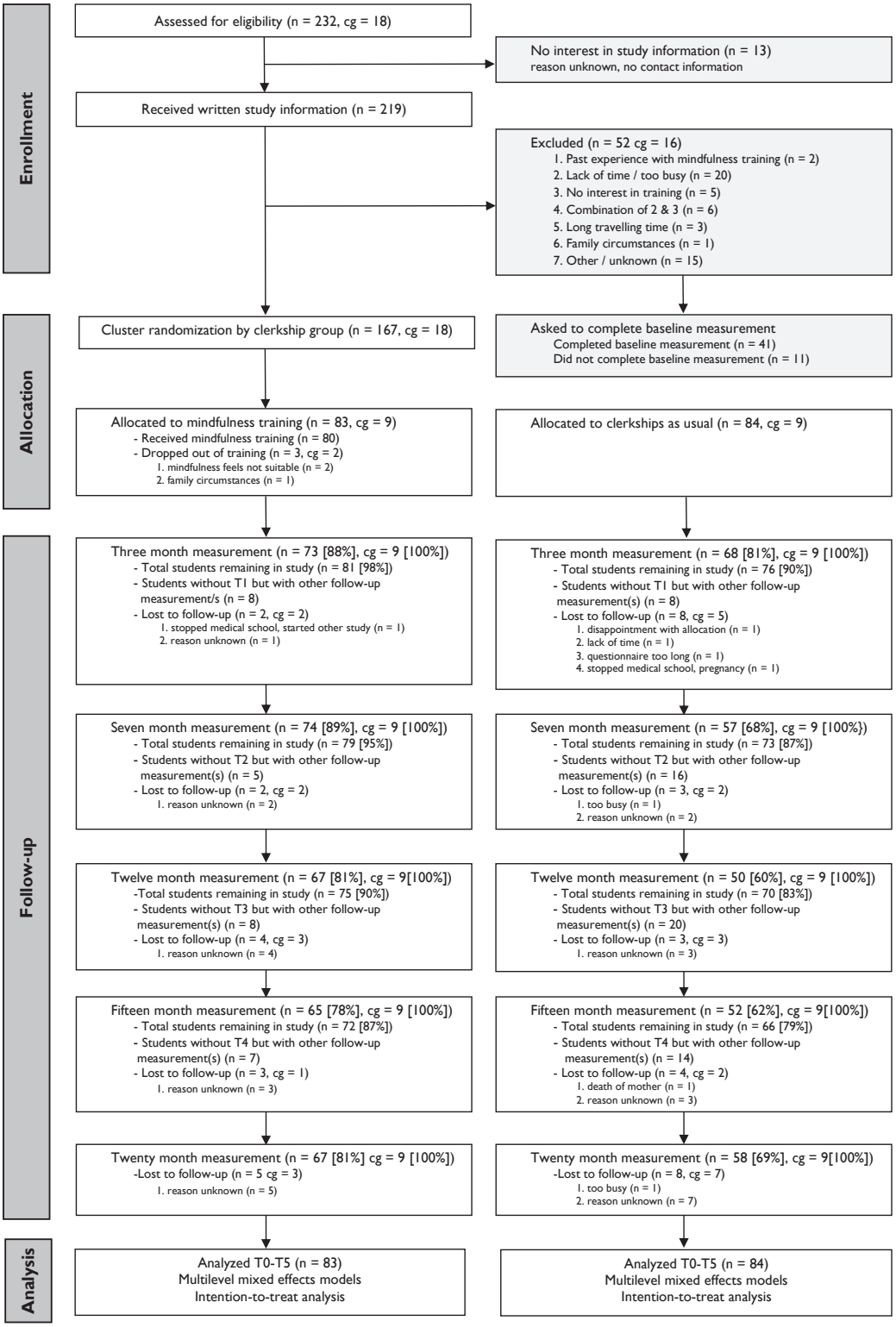
contains statements such as "patients feel better when their physicians understand their feelings." Items are scored on a seven-point Likert-type scale, ranging from 1="strongly disagree" to 7="strongly agree." The total score may range from 20 to 140, and higher scores indicate a higher level of empathy. Validity and reliability of the JSPE have been demonstrated to be high for physicians (α=0.81–0.85) and medical students (α=0.89).[27–29]

Five Facet Mindfulness Questionnaire (FFMQ)
The 39-item FFMQ assesses five domains of mindfulness skills: observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience.[30,31] Items are rated on a five-point Likert-type scale that ranges from 1="never or very rarely true" to 5="very often or always true," such that the total score may range from 39 to 195. A higher score implies a higher level of mindfulness skills. The Dutch FFMQ has been shown to have good internal consistency (α=0.85) and validity in a sample of Dutch non-meditating students.[32]

Irrational Beliefs Inventory (IBI)
The 50-item IBI assesses dysfunctional cognitions, which are considered to be related to a person's vulnerability for developing psychopathology.[33] Items in five subscales (worrying, rigidity, need for approval, problem avoidance, and emotional irresponsibility) are rated on a five-point Likert scale that ranges from 1="strongly disagree" to 5="strongly agree." The total score may range from 50 to 250, and a higher score indicates a higher level of dysfunctional cognitions. In a randomly selected Dutch university student sample, validity and reliability were satisfactory (α=0.83–0.85).[34]

Home practice
After the fourth and eighth MBSR sessions, students received an online questionnaire that asked how much time, on average, they had spent each week on home practice (see Appendix 1). They rated their time using the following five-point Likert-type scale:
0 = 0 minutes a day,
1 = 1–15 minutes a day,
2 = 16–30 minutes a day,
3 = 31–45 minutes a day,
4 = 46–60 minutes a day, and
5 = more than 60 minutes a day.

At every follow-up assessment, we asked students if they still practiced and if so, what kind of practice they performed.



n=students; cg=clerkship groups; T0=baseline; T1=3 months, T2=7 months, T3=12 months, T4=15 months, T5=20 months

← **Figure 1** *Flow chart of enrollment, allocation, follow-up, and analysis of the cluster-randomized controlled trial examining the effect of clerkships with additional mindfulness-based stress reduction compared to clerkships as usual on the mental health of first-year medical clerkship students, Radboud University Medical Center, Nijmegen, the Netherlands, 2011-2014.*

Sample size

We based our power calculation on results from our pilot study[35] and the study of Jain and colleagues,[36] who also measured psychological distress as a primary outcome measure by using the the Global Severity Index of the BSI. On the basis of the pilot study,[35] the intraclass correlation coefficient of the Global Severity Index between the groups of students starting their clinical clerkships was 0.00 (negligible). Assuming a difference of 0.10 in Global Severity Index between the intervention and control group on the second measurement with a standard deviation of 0.25 in each group, 100 students per group would be necessary to realize a power of 80% with two-sided testing using a t-test with an alpha of 0.05. Assuming a correlation of 0.5 between the baseline measurement and second measurement, 75 students per group would be necessary, 150 students in total.

Data analysis

We collected data using an online survey tool (Limesurvey, Hamburg, Germany). Using chi-square and independent-samples t-tests, we compared baseline characteristics and outcome measures (1) between the MBSR and CAU students and (2) between students who dropped out of and remained in the study. We performed an intention-to-treat analysis of all students who had been randomized into one of the two conditions. We performed both a missing values analysis and Little's missing completely at random test[37] to examine whether data were missing at random or not. For all variables, we defined values exceeding 3.29 standard deviations from the mean as outliers and, as advised by Tabachnick and Fidell,[38] transformed outlier data points to 3.29 times the standard deviation plus the mean.

We applied multilevel mixed-effects models to all analyses to examine possible differences in the overall fluctuating change of our outcome measures over time between the intervention and control group. We determined the score on each outcome as a dependent variable, and we added gender and baseline level of the dependent variable as covariates. We defined a random intercept for clerkship group level as well as individual student level, and we defined time, condition (intervention or control group), and time × condition as fixed effects in the model. We used mixed-effects models analyses, as this technique makes use of all available data for each time point, including data from students lost to follow-up. We applied a sensitivity

Table 1 *Baseline characteristics of first-year medical clerkship students from Radboud University Medical Center, Nijmegen, the Netherlands, who were randomized to either CAU or clerkships with additional MBSR, 2011–2012*

Variable, measure	CAU (n=84)	MBSR (n=83)
Demographic characteristics		
Age, median (SD)	23.3 (1.77)	23.7 (1.91)
Female gender, no. (%)	71 (85)	60 (72)
Marital status, no. (%)		
Single	36 (43)	42 (51)
In relationship, not married	47 (56)	41 (49)
Married	1 (1)	0
Nationality, no, (%)		
Dutch	78 (93)	80 (96)
German	4 (5)	2 (2)
Other	0	1 (1)
Missing	2 (2)	0
Religion, no. (%)		
Atheist	45 (54)	39 (47)
Catholic	21 (25)	26 (31)
Protestant	6 (7)	4 (5)
Muslim	3 (4)	1 (1)
Other	7 (8)	12 (14)
Missing	2 (2)	1 (1)
Mental health measures		
Psychological distress,[a] mean score (SD)	0.42 (0.29)	0.38 (0.26)
Positive mental health,[b] mean score (SD)	45.2 (8.9)	44.9 (10.6)
Other measures		
Life satisfaction,[c] mean score (SD)	4.77 (0.45)	4.74 (0.52)
Physician empathy,[d] mean score (SD)	110.3 (9.3)	110.8 (10.3)
Mindfulness skills,[e] mean score (SD)	128.5 (14.0)	131.3 (14.7)
Dysfunctional cognitions,[f] mean score (SD)	141.7 (16.6)	138.4 (14.6)

a: Global Severity Index of the Brief Symptom Inventory, range 0 – 4, higher score indicates higher distress.
b: Mental Health Continuum-Short Form, range 0 – 70, higher score indicates higher positive mental health
c: Life Satisfaction Questionnaire, mean score range 1-6, higher score indicates higher life satisfaction.
d: Jefferson Scale of Physician Empathy, total score range 20-140, higher score indicates greater empathy.
e: Five Facet Mindfulness Questionnaire, range 39-196, higher score implies a higher level of mindfulness skills
f: Irrational Beliefs Inventory, range 50-250, where a higher score indicates more dysfunctional cognitions

analysis by means of multiple imputations to examine if missing values influenced results. As it is not possible to calculate an overall effect size of the change in all six measurements, we computed effect sizes (Cohen's *d)* of the 20-month measurement using group differences corrected for baseline. We considered *d*=0.2 to be a small effect, *d*=0.5 a moderate effect, and *d*=0.8 a large effect. We performed all analyses using IBM SPSS Statistics for Windows, Version 21.0 (Armonk, New York), and we created our graphs using Microsoft Excel 2013 (Redmond, Washington).

RESULTS

Of 232 eligible students, 167 (72%) participated, and of these, we allocated 83 to the MBSR and 84 to CAU conditions (Figure 1). Of the 65 non-participants, 41 were nevertheless willing to complete a baseline assessment. Although the participants and non-participants did not differ in gender and age, participants did report higher levels of psychological distress and lower levels of positive mental health than non-participants.[35] We have provided baseline characteristics of the MBSR and CAU participants in Table 1. We detected no significant differences in age, relationship status, or gender; nonetheless, we added gender as a confounder to the analyses because male students tended to be overrepresented in the MBSR as compared to the CAU group. Students were, on average, 23 years old, and the majority were female. During the eight-week training, students spent on average 1 to 15 minutes a day on home practice. The percentage of students practicing more than that gradually decreased over the course of the MBSR training from 40% in the second week to 16% in the last week. Only 3 students (4%) attended fewer than four sessions of the training. Of 73 students, 63 (86%) applied home practice at 3 months follow-up; and of 67 students, 33 (49%) applied home practice at 20 months' follow-up. They mainly applied the "three-minute breathing space" and "deliberate awareness of routine activities" techniques.

At 20 months post intervention, 67 of 83 MBSR students (81%) and 58 of 84 CAU students (69%) had remained in the study. Students who dropped out of the study did not differ on baseline characteristics from those who remained in the study. Sensitivity analyses using multiple imputations to replace the missing values on all outcome measures revealed that missing values did not influence the overall result. Repeating all analyses without the 10 students who dropped out of the study after baseline (Figure 1) did not influence results either.

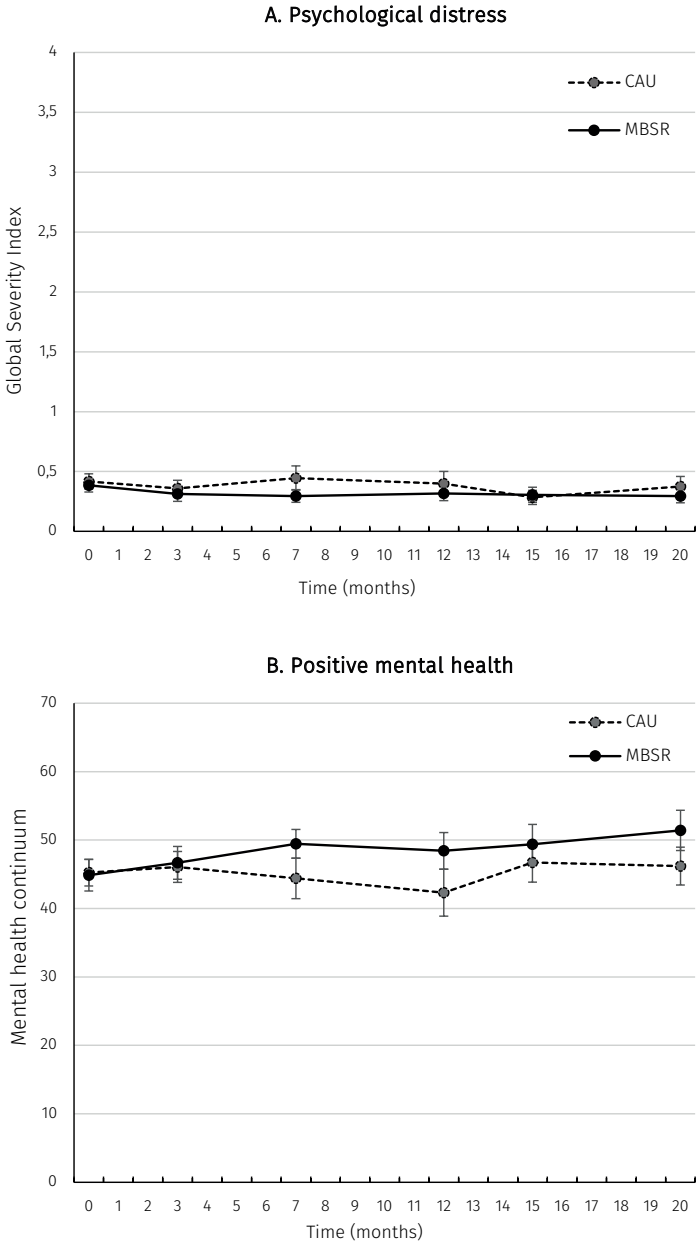
Effects of MBSR on mental health measures

Overall, students in the MBSR group reported lower levels on the primary outcome measure of psychological distress over the course of the 20-month follow-up period

Table 2 *Results of mixed models analyses of scores on all outcome measures through 20 months of clinical clerkships of first-year clinical clerkship students from Radboud University Medical Center, Nijmegen, the Netherlands, who were randomized into CAU or clerkships with MBSR, 2011-2014*

Measures	Baseline Mean (SD) [95% CI]	Three months Mean (SD) [95% CI]	Seven months Mean (SD) [95% CI]	Twelve months Mean (SD) [95% CI]	Fifteen months Mean (SD) [95% CI]	Twenty months Mean (SD) [95% CI]	F	*p* value	Cohen's *d*
Mental health measures									
Psychological distress									
CAU	0.42 (0.29) [0.35 to 0.48]	0.36 (0.28) [0.29 to 0.43]	0.45 (0.38) [0.34 to 0.55]	0.40 (0.36) [0.30 to 0.50]	0.28 (0.21) [0.23 to 0.34]	0.37 (0.32) [0.29 to 0.46]	2.5	.03	0.20
MBSR	0.38 (0.26) [0.32 to 0.44]	0.31 (0.26) [0.25 to 0.37]	0.30 (0.23) 0.24 to 0.35]	0.32 (0.25) [0.26 to 0.38]	0.31 (0.26) [0.24 to 0.37]	0.30 (0.23) [0.24 to 0.35]			
Positive mental health									
CAU	45.2 (8.9) [43.3 to 47.2]	46.1 (9.1) [43.8 to 48.3]	44.4 (10.4) [41.4 to 47.4]	42.3 (11.7) [38.9 to 45.8	46.7 (9.6) [43.9 to 49.6]	46.2 (10.2) [43.4 to 49.0]	4.0	.002	0.44
MBSR	44.9 (10.6) [42.6 to 47.2]	46.7 (10.0) [44.3 to 49.1]	49.5 (8.9) [47.4 to 51.5]	48.4 (10.6) [45.7 to 51.1]	49.4 (11.5) [46.5 to 52.3]	51.4 (11.6) [48.5 to 54.3]			
Other measures									
Life satisfaction									
CAU	4.77 (0.45) [4.67 to 4.87]	4.77 (0.54) [4.64 to 4.90]	4.67 (0.52) [4.53 to 4.80]	4.60 (0.59) [4.44 to 4.77]	4.69 (0.61) [4.52 to 4.86]	4.63 (0.59) [4.47 to 4.78]	3.0	.01	0.51
MBSR	4.74 (0.52) [4.62 to 4.85]	4.78 (0.49) [4.66 to 4.89]	4.85 (0.49) [4.70 to 4.98]	4.85 (0.46) [4.74 to 4.96]	4.84 (0.55) [4.70 to 4.98]	4.82 (0.61) [4.67 to 4.96]			
Physician empathy									
CAU	110.3 (9.3) [108.3 to 112.4]	108.4 (10.0) [105.9 to 110.8]	109.8 (8.6) [107.4 to 112.2]	108.0 (9.8) [105.1 to 110.2	110.4 (9.9) [107.5 to 113.4]	108.9 (11.2) [105.9 to 111.9]	1.5	.18	0.27
MBSR	110.8 (10.3) [108.5 to 113.0]	111.9 (9.7) [109.6 to 114.2]	110.9 (11.5) [108.2 to 113.6]	110.8 (11.6) [107.9 to 113.7]	109.7 (12.3) [106.5 to 112.8]	112.0 (11.6) [109.0 to 114.9]			
Mindfulness skills									
CAU	128.5 (14.0) [125.4 to 131.5]	127.7 (13.9) [124.3 to 131.1]	125.9 (14.9) [121.7 to 130.0]	127.8 (15.8) [123.2 to 132.4]	131.6 (15.0) [127.2 to 136.1]	127.7 (16.6) [123.3 to 132.1]	2.3	.05	0.35
MBSR	131.3 (14.7) [128.1 to 134.5]	134.0 (13.7) [130.8 to 137.3]	135.0 (14.1) [131.7 to 138.3]	135.2 (14.7) [131.6 to 138.8]	134.0 (18.4) [129.3 to 138.6]	135.6 (17.9) [131.1 to 140.0]			
Dysfunctional cognitions									
CAU	141.7 (16.6) [138.1 to 145.3]	142.2 (13.9) [138.8 to 145.6]	145.0 (12.5) [141.5 to 148.5]	141.5 (13.8) [37.5 to 145.5]	138.7 (14.4) [134.4 to 142.9]	140.7 (16.0) [136.4 to 145.0]	2.3	0.05	0.18
MBSR	138.4 (14.6) [135.2 to 141.6]	135.8 (15.2) [132.1 to 139.4]	132.1 (16.6) [128.2 to 136.0]	132.5 (17.5) [128.2 to 136.9]	132.5 (18.2) [127.9 to 137.1]	133.5 (20.3) [128.4 to 138.6]			

Figure 2 *Means and 95% confidence intervals of mental health outcome measures (A: Psychological distress; B: Positive mental health) through 20 months of clinical clerkships of first-year medical clerkship students from Radboud University Medical Center, Nijmegen, the Netherlands, 2011-2014, randomized to either following clerkships as usual or clerkships with additional mindfulness-based stress reduction.*



(p=.03, Cohen's d=0.20, Table 2 and Figure 2). They also reported higher levels of positive mental health (p=.002, Cohen's d=0.44).

Effects of MBSR on other measures

Students in the MBSR group reported higher life satisfaction (p=.01, Cohen's d=0.51), more mindfulness skills (p=.05, Cohen's d=0.35), and less dysfunctional cognitions over the course of 20-month follow-up than those in the CAU group (p=.05, Cohen's d=0.18). The MBSR and CAU groups did not differ in physician empathy (p=.18, Cohen's d=0.27).

DISCUSSION

On the basis of our findings, MBSR integrated into clinical clerkships as part of the clinical curriculum resulted in a small reduction of psychological distress (Cohen's d=0.20) and a moderate increase in positive mental health (Cohen's d=0.44). In addition, the MBSR group reported a higher life satisfaction, more mindfulness skills, and less dysfunctional cognitions (Cohen's d=0.18–0.51) over the course of a 20-month follow-up period. We detected no effect of MBSR on self-reported empathy.

Feasibility

In contrast with previous studies which often comprised only self-referred samples,[10,11,13] we offered MBSR to a consecutive sample of students as an integral part of their clinical clerkship curriculum. The percentage of medical students responding that they were willing to engage in an MBSR course was surprisingly high (72%). In addition, the dropout rate from the MBSR training was very low (4%), and follow-up rates were high. The high attendance rate might have been influenced by the fact that the MBSR occurred during working hours, during the possibly less demanding neurology and psychiatry clerkships, and that the format and content had been adapted to the medical context. Still, these findings imply that integrating MBSR into clinical clerkships is feasible and that despite contending with high workload and long hours, medical clerkship students find integrated MBSR training acceptable.

Effectiveness

Although the finding—that an eight-week MBSR training results in consistent improvements even at a 20-month follow-up period—is certainly encouraging, the absolute differences between the MBSR and CAU group are small, especially given the wide range of some of the questionnaire scores. On the other hand, our measure of psychological distress officially ranges from 0 to 4, but in practice in non-clinical samples, the actual range is much smaller because the data distribution is highly

skewed to the right and a cutoff of 0.58 is used for screening for psychopathology.[21] Improvements in psychological distress in our student sample occurred within the normal, nonpathological range. Although not addressing psychopathology, this finding might still be relevant—for example, in students' capability to cope with patient-care-related work stress. Further research should include this long-term perspective. To assess the clinical relevance better, outcome measures other than self-report questionnaires might be used; for example, investigators might use either blinded interviews to assess mental health or patient-rated measures to evaluate the professional attitude of students.

The small effect on psychological distress might be partly due to the lower baseline levels of distress in the participants of this study compared with medical students beginning their clinical rotations in the United States and Canada, offering less room for improvement. Although these relatively low levels of psychological distress could be explained by possible cultural differences or differences between medical curricula, a more important explanation could be that our consecutive study population might report less distress than the often selective self-referred populations of previous studies. This possibility aligns with the review of Hope and Henderson,[4] who found that higher-quality studies reported a lower prevalence of psychological distress. The finding that, in our sample, positive mental health improved more than psychological distress supports previous results that these are two related yet distinctive concepts, rather than two ends of the same continuum.[7,8,22,39]

Contrary to the findings of Krasner and colleagues[40] in general practitioners, we did not find an effect of MBSR on self-reported empathy. This lack of effect might be explained by the different stage of professional development and the younger age of these students compared with the physicians in the Krasner study. In addition, several studies in medical students show that self-reported empathy does not correlate with observer- or patient-reported empathy.[41–43]

Strengths and limitations

To our knowledge, this is the only randomized controlled study of an eight-week MBSR course in medical clerkship students. The integration of the MBSR into the clinical clerkships, the consecutive sample, the large sample size, the high response rate, the low dropout, and the 20-month follow-up are all important strengths of the study.

We also note some limitations. The study occurred in a single medical school in the Netherlands, which might limit generalizability, even though students were allocated for their clinical placements at different, affiliated hospitals in the region. Medical clerkship students in Europe are usually younger than students in the United States and Canada, which could be another aspect limiting international generalizability.

As the study lacked an active control condition, we cannot assume that effects are specifically related to the MBSR and not to peer support or attention. Social spread of the intervention to the control group (cross-contamination) seems unlikely as the cluster-randomization prevented students from the intervention and control conditions taking classes together either during or after the training; however, we cannot guarantee that students did not have contact with each other and share information about MBSR, which could have reduced group differences.
Other factors that might have reduced group differences are the lack of booster sessions during the 20-month follow-up period and the fact that many students completed the 15-month follow-up assessment during a holiday, which started shortly after they received that questionnaire. Regarding the possible influence of seasonality, our inclusion period lasted 18 months, and measurements were scattered across all seasons; therefore, we believe seasonality had little to no effect on the results.
Although allocation of the groups was not concealed to the coordinating researcher (I.v.D.), we expect the impact of this lack of blinding on the results to be limited. The researcher had no knowledge of clerkship group composition at the time of randomization and therefore could not influence the allocation of specific students to a condition. In addition, scores on outcome measures could not be influenced as both baseline and follow-up assessments were completed online, without personal contact. Finally, as our study focused on feasibility and integration of the intervention in the curriculum, we did not examine possible individual differences in response to the intervention. Future research will have to address this question.

CONCLUSION

Integrating MBSR training into the core curriculum of clinical clerkships appears to be both feasible and acceptable. Participating in this training resulted in a small to moderate improvement in the mental health of medical clerkship students over a 20-month follow-up period. One of the key competencies listed in the CanMEDS physician competency framework for the professional role is demonstrating a commitment to physician health and well-being so as to foster optimal patient care.[44] The development of competencies such as “exhibiting self-awareness,” “managing influence on personal well-being and professional performance,” and “managing personal and professional demands” are not usually addressed in clinical clerkships, which are mainly focused on developing knowledge and clinical skills. MBSR, however, specifically addresses these competencies and could therefore be a valuable part of the curriculum, supporting the development of students into balanced professionals. However, as this is, to our knowledge, the first randomized controlled trial of the

eight-week MBSR with a long-term follow-up, replication studies with active control conditions and outcome measures assessing professional attitude are needed to strengthen the evidence supporting these assertions.

APPENDIX 1

Information on Mindfulness-Based Stress Reduction training (MBSR)

Original curriculum

- Developed by Kabat-Zinn[9] for use in patients with unexplained somatoform disorders
- Eight-week 2.5 hour training with a fixed program
- Comprehensive folder containing an explanation of the exercises and home practice
- Formal exercises comprise body scan, sitting meditation, and mindful movement
- Informal exercises include awareness of breathing, awareness of routine activities such as eating, walking, cycling
- One-day silent retreat during the sixth week of the program
- Daily home practice with help of CDs/audio recordings comprising weekly alternating formal and informal exercises such as the body scan, sitting meditation, and awareness of routine activities
- Group dialogue and inquiry oriented around weekly in-session exercises and at-home assignments

Alterations to the curriculum used with first-year medical clerkship students from Radboud University Medical Center, Nijmegen, the Netherlands

- Two-hour weekly program instead of 2.5 hours each week (therefore some exercises were shorter)
- Addition of ten minutes of interactive presentation each week related to the session theme (e.g., awareness of stress) with examples of (or examples of a lack of) mindful awareness in hospital daily practice
- No silent retreat
- Adaptation of the folder material for use in medical clerkship students instead of patients, plus addition of examples related to clerkships and resources related to the session themes

Summary of weekly theme with core exercises and home practice

Week 1: Recognizing automatic behavior ("the automatic pilot")
- Raisin practice: using all senses to explore an object
- Bodyscan: practice being aware of different parts of the body
- A routine activity with deliberate awareness (e.g., taking a shower)

Week 2: Influence of perception
- Bodyscan: practice being aware of different parts of the body
- Sitting meditation: awareness of breathing
- A routine activity with deliberate awareness (e.g., taking a shower)

Week 3: Recognizing boundaries
- Yoga: awareness of movement, respecting physical boundaries
- Pleasant events log: inquiry thoughts, feelings, bodily sensations
- Three-minute breathing space, a short pause during the day

Week 4: Awareness of stress
- Sitting meditation: awareness of breathing, body, sounds
- Unpleasant events log: inquiry thoughts, feelings, bodily sensations
- Yoga: awareness of movement, respecting physical boundaries

Week 5: Mindful response to stress
- Sitting meditation: breathing, body, sounds, thoughts, difficult situation
- Stressful events log: automatic reaction versus mindful response

Week 6: Communication
- Yoga; awareness of movement, respecting physical boundaries
- Walking meditation
- Practice mindful communication + group inquiry

Week 7: Work-life balance
- Sitting meditation: choiceless awareness
- Group dialogue: Activities demanding energy and giving energy

Week 8: Week 8 lasts the rest of your life
- Bodyscan: practice being aware of different parts of the body
- Make a plan of action for keeping up your skills

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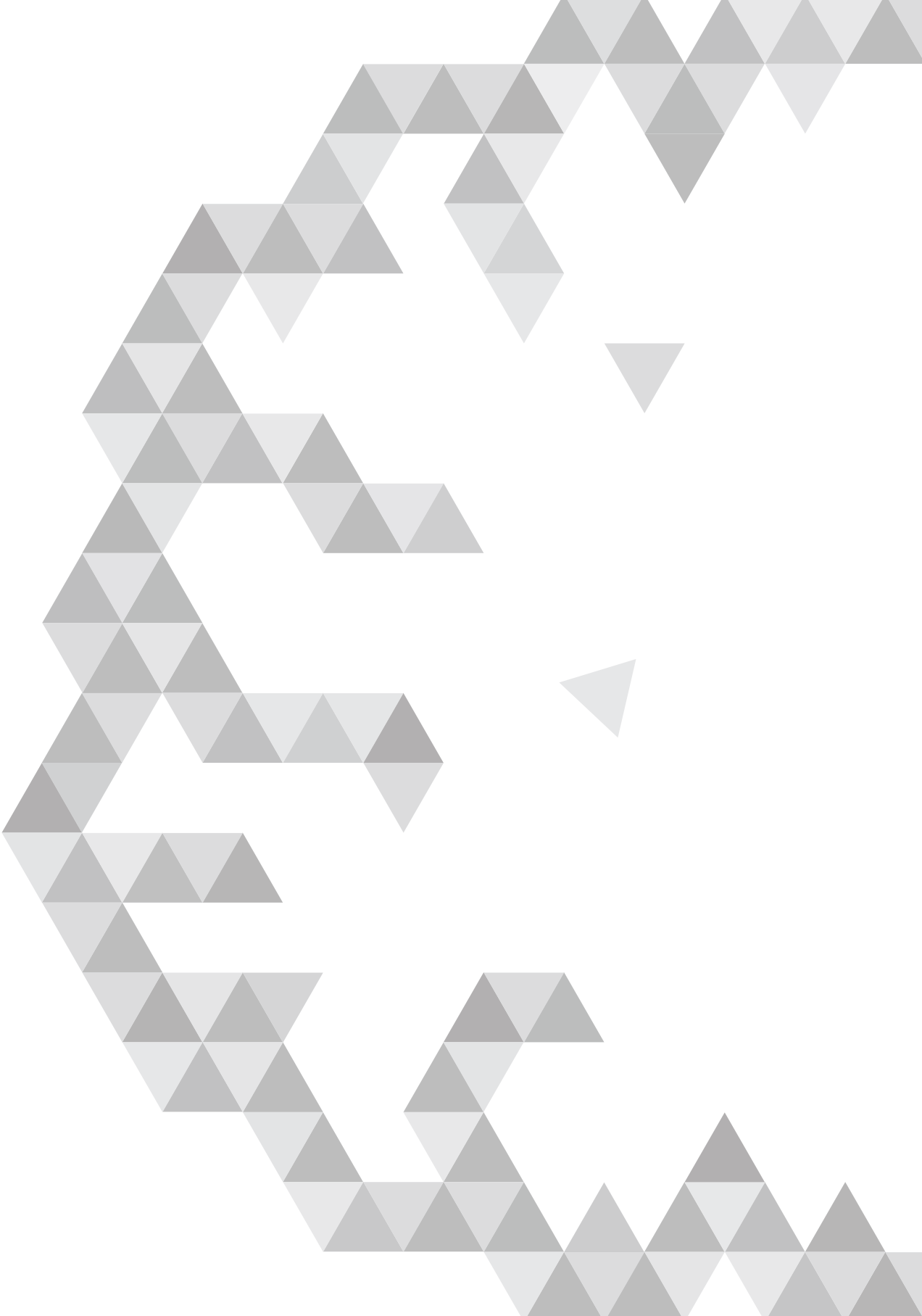

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"I was always trying to do everything at once": Medical clerkship students' long-term mindfulness practice

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Under review

ABSTRACT

Purpose

To explore the nature and effects of mindfulness practice of medical clerkship students two years after participation in an eight-week mindfulness-based stress reduction (MBSR) training.

Method

From October 2013 until March 2014 the authors interviewed sixteen students who had participated in MBSR two years before about their current mindfulness practice. Two researchers listened back, transcribed and coded the audio-taped interviews. Using constant comparative analysis, codes were grouped into categories, which were divided over themes and visualized in a model.

Results

Six main themes came forward; (1) the *'unchanged lifestyle'* reported by students that discontinued practice; (2) understanding and intention as *'pre-conditions'* for developing long-term practice; (3) *'attention regulation and awareness'* during daily activities as core elements of students long-term mindfulness practice; (4) *'changed ways of coping'* that resulted from practice, making room for a conscious response; (5) *'increased quality of life'* by enhanced enjoyment of daily activities, improved work-life balance and sometimes even different career choices and; (6) the practical, personal and professional *'barriers and facilitators'* of students' mindfulness practice.

Conclusion

Two years after an eight-week MBSR training, students reported a diversity in long-term effects of which 'attention regulation and awareness' during daily activities appeared core aspects.

INTRODUCTION

Managing the high demands of healthcare requires physicians to be well-balanced and healthy. The CANMEDS physician competency framework, which is currently used in many medical curricula worldwide, describes physician abilities that are necessary to meet the healthcare needs of society. These abilities are organized under the seven major roles of communicator, collaborator, leader, health advocate, scholar and professional.[1] Physicians' commitment to their own health and well-being is part of the 'professional role' and self-awareness is mentioned as an enabling competency. When meeting a patient, every physician takes his or her own history, beliefs, attitudes, needs, emotions and expectations into the consultation room. Developing self-awareness enables us to recognize these personal factors and the influence they have on our communication and behavior.[2,3] Self-awareness in stressful situations facilitates physician well-being and is an important factor in the development of empathy.[4,5] Although its importance is recognized, many curricula still lack programs teaching students how to develop and maintain self-awareness and well-being throughout medical school. Current interventions directed towards enhancing self-awareness exist mainly of group discussion of emotionally challenging clinical situations and personal experiences, or individual feedback during clinical situations.[6]

An alternative approach to supporting self-awareness and self-care is mindfulness-based stress reduction (MBSR) training. Instead of discussing situations, the aim of MBSR is to teach participants self-awareness of their thoughts, feelings and sensory perceptions by means of direct experience: by practicing. MBSR is a standardized eight-week group training existing of exercises such as sitting and walking meditation, a body scan, mindful movement, mindful speech, group inquiry and homework such as performing a number of daily activities with deliberate awareness.

In medical clerkship students, an adapted four-week twice a week mindfulness elective resulted in a significant reduction of depression, emotional exhaustion and perceived stress as well as a significant increase of self-compassion and mindfulness.[7] An RCT from our own group demonstrated that clerkship students completing MBSR reported a reduction of psychological distress and an improvement of positive mental health over the course of a 20-month follow-up period.[8]

Overall, quantitative research has dominated the field so far.[9] There is only one qualitative study examining the short term experiences of preclinical medical and psychology students shortly after completion of an abridged mindfulness training.[10] That study reported two main themes 'understanding mindfulness' and 'engaging in mindfulness', which influenced each other. The aim of the current qualitative study is to explore the nature and possible effects of mindfulness practice in medical clerkship students two years after participation in MBSR.

METHOD

We performed a qualitative interview study with participants of the intervention group of our RCT, which examined effects of MBSR training on the well-being of medical clerkship students. This study has been described in detail elsewhere.[8] We used the method of constant comparative analysis aiming to recognize themes and their possible relationship in our data. The Consolidated criteria for Reporting Qualitative research (COREQ)[11] and the Standards for Reporting Qualitative Research (SRQR)[12] were used as guidelines in reporting our results. The study was approved of by the ethical committee of the Radboud University Medical Center, Nijmegen. Protocol registration nr. 2010/388 and ABR nr: NL33969.091.10.

Mindfulness-based stress reduction

The MBSR training consisted of eight weekly two-hour sessions which took place from 4.30 PM to 6.30 PM at the start of clinical clerkships. The courses took place between February 2011 and September 2012 and were taught by a psychiatrist (AS) and a physician, which both met the standards for UK good practice MBSR guidelines.[13] The program consisted of formal and informal meditation exercises, psycho-education about stress, group dialogue and daily home practice.

Participants

From the end of October 2013 until March 2014 we used 'purposive sampling' to select 16 students for an in depth face-to-face interview, based on gender, clerkship group, duration since training and how they appreciated the course (grade 0 to 10). Students were recruited from our quantitative study in which 167 students (response rate 72%) were cluster-randomized by clerkship group to following clerkships as usual (n=84) or receiving an additional eight-week MBSR training (n=83).[8] Eighteen students from the MBSR group were approached by telephone and were informed about our study. If they were interested they received an information letter and were phoned a few days later to schedule an interview. Two students did not participate: one showed interest initially, but did not respond to follow-up contact while the second wanted to participate but could not arrange a meeting within the requested time period. Mean age of students was 27.6 years (range 23 to 45) and the mean time between MBSR and interview was 2.2 years (range 1.5 to 2.9). The students originated from 7 different MBSR training groups and evaluated the training with grades varying from 6 to 9.

Interviewers

A female psychologist in training and female psychiatrist in training (IvD), not previously known to the students, conducted the interviews. At the time of the

interviews the coordinating researcher (IvD) was 34-years old and participated in a two-year post academic traineeship to become MBSR/MBCT trainer. She was co-trainer in three MBSR trainings for medical clerkship students and taught one by herself as part of the traineeship. IvD completed an interactive qualitative research course and being a resident in psychiatry had extensive experience in interviewing patients and their relatives. The second interviewer was a 40-year old coordinator of healthcare programs in a primary care center. As a former HR manager and manager of primary care centers, she had extensive experience in communication with clients. She completed an eight-week MBSR and was therefore familiar with mindfulness terminology. Participation in this research project was part of her psychology internship. She prepared for the interviews by means of simulated interviews.

Setting

Fourteen interviews were held at the department of Primary and Community Care of the Radboud University Medical Center, which was unknown, neutral area for the students. One interview was conducted by means of an online video call and one at the home of the student.

Data collection

The interviewers used a topic guide containing the main questions related to the research question, but were free to introduce other topics when relevant. The topic guide was repeatedly revised based on the discussions after each interview. The final (fifth) version is provided in Appendix 1. The audio-taped interviews lasted 21 to 44 minutes, with a mean duration of 34 minutes. An anonymized half page summary of each interview was e-mailed to the student for approval or adaptation. IvD kept a log containing notes about the process and content of data collection and analysis. As no new information seemed to arise, saturation took place after 16 interviews.

Process of data-analysis

All interviews were transcribed to anonymized word documents and uploaded in Atlas.ti 7 for Windows (Scientific Software Development GmbH, Germany), a software program for qualitative data analysis. The interviewers independently read and coded the transcribed text of each interview, compared their codes and discussed them until they reached consensus. We analysed data according to the method of constant comparative analysis, looking back at our results after each interview and adapting codes and categories if necessary. After four interviews we started grouping codes into overarching categories, which were later grouped into themes. About halfway the process of coding and categorizing, the interim results were presented at a research meeting for mindfulness researchers of the Radboud University Medical Center. During this meeting we brainstormed about possible relationships between categories and themes.

RESULTS

The 16 interviews resulted in a total of 155 codes in 42 categories. Six main themes related to the nature and effects of students long-term mindfulness practice came forward; (1) unchanged lifestyle; (2) pre-conditions for practice; (3) core practice: attention regulation and awareness; (4) changed ways of coping; (5) effects on quality of life and; (6) barriers and facilitators of developing mindfulness practice. Figure 1 visualizes these themes, subthemes and their relationship. All students elaborated on one or more of these six themes. A number of students stated in the beginning of the interview that they did not engage in mindfulness practice anymore because they stopped using formal meditation exercises. However, when they were asked about informal practice they realized that they had integrated aspects of mindfulness practice into their life.

1. Unchanged lifestyle

Some students reported that they had maintained their previous lifestyle without integrating mindfulness practice after the training. Usually when a student felt no need, he already used other ways of increasing well-being such as sports or prayer:

> *"It is more that I don't feel the need for it, as it seems. I'm a Muslim and then you already pray five times a day and have a moment of contemplation and rest, that is already built in for you."* [Student 14]

2. Preconditions for practice: understanding and intention

2.1 Understanding

The understanding of what mindfulness is and how it could be integrated into students' lives influenced their decision whether or not to continue practice after the training. An unrealistic or incorrect understanding discouraged students from practicing, for example one student defined mindfulness as a way to distract yourself from distress which she did not find useful. For another student gaining a better understanding of mindfulness was the only long-term result she reported:

> *"...at least I know what it is now and I'm actually happy with that."* [Student 10]

2.2 Intention

Next to a realistic understanding, also the intention to practice appeared a precondition, which was related to students' considering whether now would be 'the right time' for practice. A lack of intention resulted in long-term postponing:

> *"Well, what I do think is that in a few years it'll possibly do something and then I will at least have the tools and will be able to use them. But I think that now I'm just not ready yet. That's it."* [student 7]

3. Attention and awareness

The core of students' long-term mindfulness practice, described by almost all students, existed of consciously paying attention to sensory perceptions during daily activities or using a short mindfulness exercise (e.g. 3-minute breathing space). In all cases this focus of attention was directly linked to an enhanced awareness during the activity for example when brushing their teeth or taking a walk:

> *"When I'm taking a walk in the forest I stand still, take a deep breath and just notice the forest without being occupied with other things."* [Student 8]

4. Changed ways of coping

Being more aware of a situation supported students in dealing with it differently by taking a pause, reflecting on the situation or by recognizing automatic behavioral patterns:

> *"I really thought well yes, I was always trying to do everything at once. So that was an insightful moment. When I brushed my teeth then I would do three other things while brushing my teeth instead of brushing them consciously."* [Student 13]

This made room for a conscious *internal* response for example by allowing emotions instead of repressing them or by decentring from negative thoughts:

> *"Well, if I have those crazy thoughts like 'life isn't worth living anymore' then I can think 'it is just a thought' and it feels as if I can look at it from a distance instead of diving further into it."* [Student 4]

Occasionally, students mentioned that they could easier accept a difficult situation or feeling:

> *"When experiencing tension or stress, before I wanted it to go away, I didn't want to feel it. The training taught me another way to deal with it: 'ok, well, that is the way it is'."* [student 1]

A conscious response could also be *external* existing of different behavior for example when a computer doesn't work properly:

> *"I just sit back and wait, often you can see on screen that it is 'thinking' or that it restarts. Then I just wait until maybe it solves itself. Normally I would have pushed all buttons and would have called someone for help, but now I first just wait."* [student 11]

5. Effects on quality of life

5.1 Personal

In some situations students' mindfulness practice itself; paying more attention and being more aware of daily activities, *directly* resulted in feeling better, in enjoying life more:

> *"That you cycle home and just take the time to enjoy the nice ride. That the birds are singing and the sun is shining, those kind of things. That the trees are beautiful, well, those are things that I didn't really pay attention to in the past."* [student 11]

In other situations, quality of life increased *indirectly* as a result of their changed ways of coping for example after letting go of dysfunctional patterns:

> *"I used to be preoccupied with other people's opinions of me, so badly that I couldn't even listen to what they would say. That has become less and less."* [student 4]

5.2 Professional

A number of students reported an improved work-life balance as a result of setting more boundaries, expressing their opinion towards superiors and learning not to take work problems home:

> *"I became more aware that I have to separate work from private life. Go home without taking work problems home. For example if I've seen a complex patient I first discuss it with a colleague and then finalize it without taking it home."* [student 11]

Some students even explained how the increased awareness of work-life balance after the training supported them in making a conscious career choice:

> *"Because of that, I started thinking about if I wanted to work in the hospital or outside the hospital. I noticed that there is a big difference in how people treat each other in the hospital, which I experience as more stressful."* [Student 9]

6. Barriers and facilitators

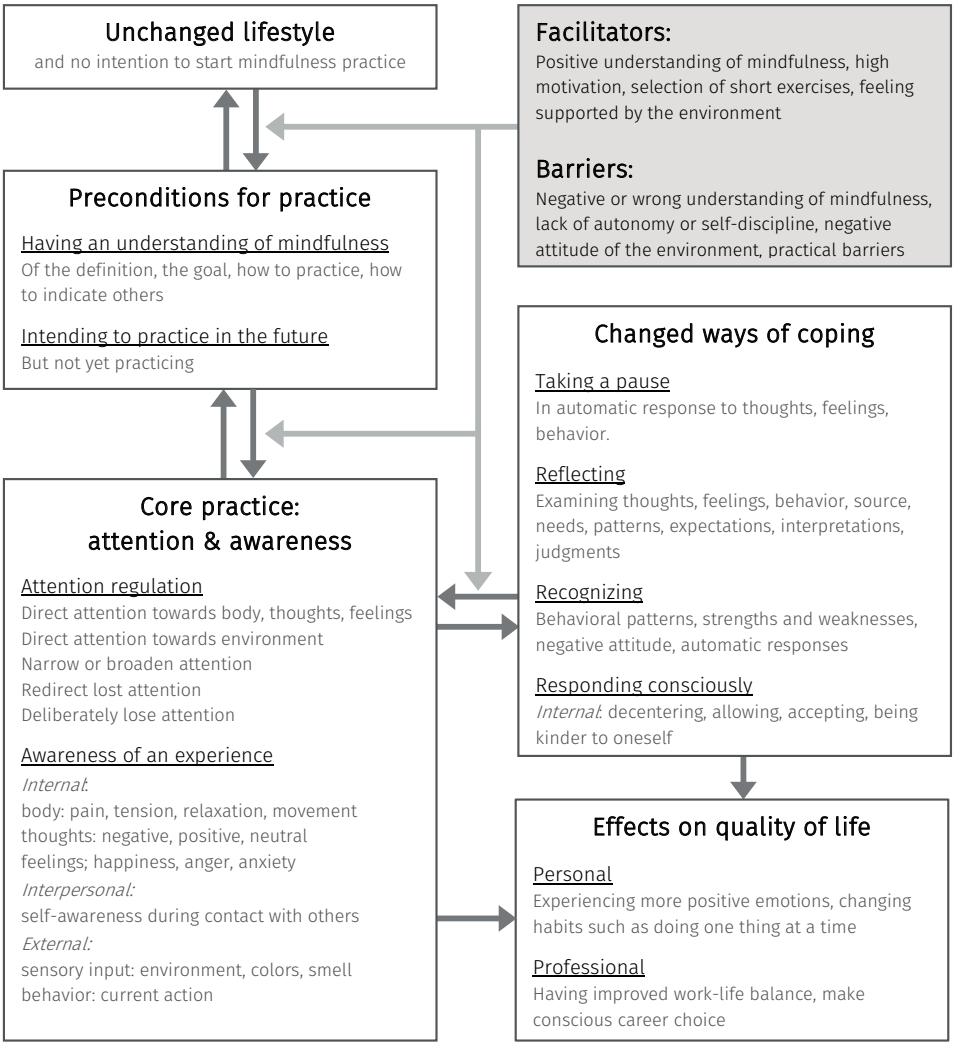
6.1 Practical

Practical aspects such as time and having a space to practice were often mentioned as barriers for practice. Although students were satisfied that the training took place in the beginning of clerkships, their busy schedule and lack of autonomy caused them to practice at best around 15 minutes a day.[8] As a result, some students felt insufficiently equipped to maintain their practice.

6.2 Personal

As mentioned before, students' understanding of mindfulness and their intention were the most important factors in whether or not they maintained their practice. Practicing only the formal and informal exercises that they liked most and experiencing positive effects of exercises were additional facilitators while a lack of self-discipline and feeling no need to practice were additional barriers.

Figure 1 *Nature and effects of mindfulness practice of medical clerkship students from Radboud University Medical Center, Nijmegen, the Netherlands (2013-2014), two years after participation in mindfulness-based stress reduction training.*



6.3 Professional
Specifically during clerkships, a lack of autonomy, supervisors' negative opinion about mindfulness and high work pressure were mentioned as reasons for discontinuing mindfulness practice. Being able to select short exercises was a facilitator.

DISCUSSION

The nature of students' long-term mindfulness practice varied from no practice at all to maintaining regular, mostly informal practice. Core practice existed of focusing attention on bodily sensations or the environment during daily activities (attention regulation) followed by enhanced awareness. In some students this resulted in changed ways of coping by taking a pause, reflecting on the situation or recognizing automatic behavioral patterns, making room for a conscious response. Students described both conscious internal responses such as taking distance (decentring) from negative thoughts, as well as external responses such as changing behavior towards a clerkship supervisor or patient.
Overall, students' mindfulness practice and their changed ways of coping enhanced their enjoyment of daily activities, improved their work-life balance and sometimes even resulted in different career choices.

Importance of the understanding of mindfulness

Having a realistic understanding of mindfulness appeared to be a precondition for maintaining long-term mindfulness practice. This confirms previous findings in first-year medical and psychology students shortly after MBSR; Students with an instrumental approach of mindfulness experienced less benefits than those with a more comprehensive understanding.[10] Although in the current study not all students developed a longstanding mindfulness practice, having participated in a training could in itself be valuable. Medical students with mindfulness experience have a greater knowledge of and are significantly more likely to administer or recommend it to others than students without exposure to mindfulness.[14]

Attentional versus attitudinal changes

In current scientific literature 'intention' (purposefulness), 'attention' (observing internal and external experiences) and 'attitude' (the way one pays attention) are distinguished as three core aspects of mindfulness which are interwoven and occur simultaneously.[15] In our qualitative study, intentional and attentional aspects were clearly present, but changes in the way students payed attention (e.g. non-judging, compassionate) were rarely mentioned. This is again similar to the findings of the aforementioned study in first-year medical and psychology students upon

completion of a MBSR training.[10] In contrast, in a qualitative study among Dutch medical residents six months after MBSR, 'acceptance and non-judgment' was one of five central themes.[16] Also physicians and other healthcare professionals reported the cultivation of an increasingly open and self-compassionate attitude towards themselves.[17]

The less profound attitudinal changes in our students might be related to their younger age and lack of work experience. Students were invited to mindfulness training during the core curriculum without selection on distress level, which might have caused them to practice less. Compared to the residents and healthcare professionals who applied for the training themselves, they also might have had less understanding of mindfulness beforehand. In addition, practicing attention regulation and awareness might simply be easier than cultivating a compassionate, non-judging attitude. And finally, many students used only the exercises that they liked most, avoiding impatience and frustration. This might have offered less opportunities to cultivate attitudinal changes. Despite this, it is encouraging that although formal practice after two years is rare, students still reported relevant benefits.

Strengths and limitations

Strong aspects of our study include the representative population of the original RCT and the use of the purposive sampling method for the qualitative study. Unfortunately, we did not offer students booster sessions, which might have contributed to a less developed long-term mindfulness practice. Although in the interviews we explicitly asked students about their current mindfulness practice and its consequences, we cannot be sure that all the stated changes directly resulted from the MBSR training and not from maturation and gaining other life experiences.

Implications for practice

In light of the demanding clerkship schedule which seems an important barrier, the question rises what the right timing and format would be for offering medical students a mindfulness-based stress reduction training. Offering the training shortly before the start of clerkships with follow-up meetings every month or two could be an alternative format. This enables students to practice more during the training period, laying a foundation for long-term integration which could be established through the follow-up meetings. Based on our results it seems valuable to actively assess the development of students' understanding of mindfulness during a training, to avoid unrealistic ideas or expectations. Also examining attitudes of supervisors and other role-models could be important to prevent students from adapting to their environment and discontinuing mindfulness practice.

CONCLUSION

Despite the busy clerkship schedule, the limited practice of students and the relatively short training period of eight weeks, many students still engaged in some form of mindfulness practice two years after the training. Mindfulness practice strengthened students' attention regulation and self-awareness, enabling alternative ways of coping which could lead to improvements in personal and professional quality of life. Offering a training shortly before clerkships with longer follow-up might better support students in maintaining a long-term practice.

APPENDIX 1:

Interview guide version 5

Introduction:
-Introduction, coffee/tea
-Welcome, thank for participation
-Interviews are part of overarching Interns InSight Study, on the well-being of clinical clerkship students
-Ask permission for audio-taping, explain procedure of anonymizing data, state independence of interviewer and expected duration of interview

Topic 1: Effect of MBSR on personal life:
- Which expectations did you have about the training beforehand?
-Which intention did you have for participation in the training? What did you want to learn?
-How did you experience the training?
-How did the home practice go? What were barriers? What was helpful?
-Which exercises do you remember?
-Which effect did this exercise have (if any)?
-In general, did you pick up something useful from the training or not? If so, what?
-When? How? With what consequence? In which situation? With which effect?
-How did you learn that? Which part of the training was (un)helpful?
-How is your mindfulness practice now compared to shortly after the training? Are there differences between now and then? How did it go over time?
-How did you continue after the training (if you continued)?
-Do you still use anything from the training? Informal exercises? Which? Where? When? How? With which consequence?
-Are there aspects of the training that you have integrated in daily life? Which, where, when, how? With which consequence?
-What were barriers and facilitators in this process?

Topic 2: Effect of training on professional life
-Are there any aspects of the training that you use in professional life? (if present, ask for the before mentioned experiences in personal life)
-Can you give an example? Can you tell something more about that? (what, where, when, how?)
-If it is unclear for a student what kind of examples you mean: give example of application in stressful situation
-If a student does not engage in mindfulness practice during work but does give

examples of mindfulness practice in personal life:
-Do you know why there is a difference between mindfulness practice in your personal and professional life? What could be the cause of that? Could you give an example?
-Ask students about their mindfulness practice related to specific topics that were addressed during the training such as stressful situations, communication with patients or colleagues, accepting and allowing emotions, work-life balance.

Topic 3: Evaluation of the training
-Looking back, what do you think of the structure of the training?
-The duration? The shape? The timing (at that time during clerkships)?
-The teachers?
-After the training, did you have an idea about how to integrate mindfulness practice in daily life or professional life? If not, how could the training be improved to support that?
- Home practice: if practiced little, what would have supported home practice?
-Does a mindfulness training add something to the curriculum or not?
-Can you give an example? Tell something more about that?
-Any suggestions for adaptations of the training?

If the interviewee did not benefit from the training:
- Did you have any expectations about the effects of the training? What was the aim for you? In what way did the training not meet that expectations?
- Explain difference between formal and informal practice and ask about informal practice
- Is there a way in which you could have benefitted more from the training? How? Adaptation of training?

Helpful questions in general:
- In which situations? - Can you give an example? - When do you apply that?
- Is there a reason for that? - How do you do that exactly? - How did that go?
- Can you tell something more about this? - What does ..... mean to you?
- What exactly do you mean by.....? - What kind of effect does that have on you?
- How does it benefit you?

Closure:
Any questions? remarks?
Thank for participation
Check e-mail address for sending summary (member check)

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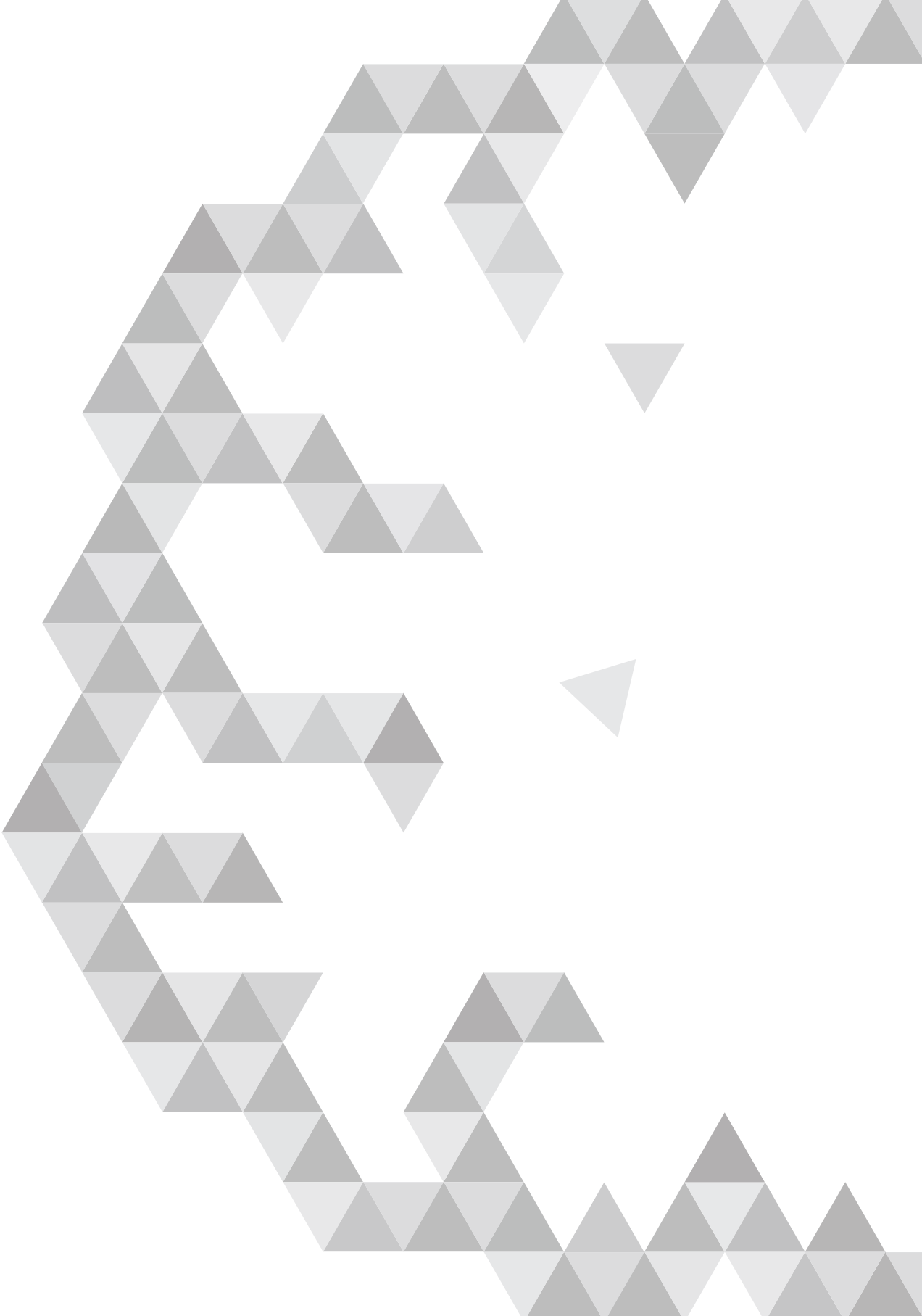

6

Reliability and validity of the Dutch version of the Consultation and Relational Empathy Measure in primary care

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Family practice, 2016

ABSTRACT

Background
Empathy is an essential skill in doctor–patient communication with positive effects on compliance, patient satisfaction and symptom duration. There are no validated patient-rated empathy measures available in Dutch.

Objective
To investigate the validity and reliability of a Dutch version of the Consultation and Relational Empathy (CARE) Measure, a widely used 10-item patient-rated questionnaire of physician empathy.

Methods
After translation and back translation, the Dutch CARE Measure was distributed among patients from 19 general practitioners in 5 primary care centers. Tests of internal reliability and validity included Cronbach's alpha, item total correlations and factor analysis. Seven items of the QUality Of care Through the patient's Eyes (QUOTE) questionnaire assessing 'affective performance' of the physician were included in factor analysis and used to investigate convergent validity.

Results
Of the 800 distributed questionnaires, 655 (82%) were returned. Acceptability and face validity were supported by a low number of 'does not apply' responses (range 0.2%–11.9%). Internal reliability was high (Cronbach's alpha 0.974). Corrected item total correlations were at a minimum of 0.837. Factor analysis on the 10 items of the CARE Measure and 7 QUOTE items resulted in two factors (Eigenvalue>1), the first containing the CARE Measure items and the second containing the QUOTE items. Convergent construct validity between the CARE Measure and QUOTE was confirmed with a modest positive correlation (r=0.34, n=654, p<0.001).

Conclusion
The findings support the preliminary validity and reliability of the Dutch CARE Measure. Future research is required to investigate divergent validity and discriminant ability between doctors.

INTRODUCTION

The doctor–patient relationship is a dynamic process involving characteristics of doctor and patient and their interaction. In their synthesis of 11 qualitative studies, Ridd et al. report that the doctor's consultation skills are a main factor contributing to development and maintenance of doctor–patient relationships. Patients would like their doctor to be interested, listening well, open, caring, explaining clearly and involving them in the decision-making process as much as they want to be involved.[1] Although the word 'empathy' is not included here, this description matches the empathic doctor as previously described by Mercer and Reynolds.[2] They defined empathy as an ability to (1) understand the patient's situation, perspective and feelings (and their attached meanings); (2) communicate that understanding and check its accuracy and (3) act on that understanding with the patient in a helpful (therapeutic) way.[2]

Assessing physician empathy in consultations can be done by means of physician self-reported, patient-reported or observer-reported measures. Given the fact that correlations between these three methods vary widely,[3–5] patient-reported measures seem to be more relevant when examining empathy in the doctor–patient consultation. Recent scientific literature shows that patient-reported physician empathy positively influences aspects of the doctor–patient relationship and disease outcomes such as interpersonal patient–physician trust,[6] compliance,[6,7] patient satisfaction,[6,7] patient enablement,[8] and the severity[9] and duration of symptoms.[10] In light of these results, it is not surprising that academic staff rated 'good empathy skills' as one of the most desirable characteristics of students entering medical school.[11] The only currently available Dutch measure of physician empathy is the Dutch Jefferson Scale for Physician Empathy (JSPE),[12] a self-report measure and a direct translation of the American JSPE without subsequent validation.
Different aspects of the clinical encounter such as doctor–patient communication,[13] patient expectations[14] and consultation length[15] are influenced by the cultural background of patient and doctor.[13] This makes the availability of patient-reported physician empathy measures in a variety of languages, including insight in their psychometric characteristics, relevant for the international research community. A review of commonly used English empathy measures in medicine showed that, of the four available patient-report measures, only the Consultation and Relational Empathy (CARE) Measure had sufficient evidence of reliability and validity.[16] The original CARE Measure consists of 10 items and has been developed specifically for assessing empathy in the doctor–patient consultation.[17,18] The current study assesses reliability and convergent validity of the Dutch CARE Measure, translated from English, in a Dutch primary care population.

METHODS

Translation of the CARE Measure into Dutch

The original English CARE Measure consists of 10 items that can be scored on a Likert scale from 1 (poor) to 5 (excellent) and a 'does not apply' option. The original English version of the CARE Measure was translated into Dutch by two native Dutch speakers who were both fluent in written and spoken English (a general practitioner in training and a psychiatrist in training). They made a the first draft of the Dutch version. The draft was independently translated back into English by two different bilingual native Dutch speakers who were not familiar with the original English CARE Measure. As these back translations were very close to the original English version, in consultation with the original author of the CARE Measure (SWM), the Dutch version was finalized without further alterations.

Procedure

The study was conducted in collaboration with 19 GPs from 5 primary care practices based in the center and South-East part of the Netherlands. The practices differed in size and location, including practices in the city as well as in rural areas. Immediately after the consultation, the GP asked the patient if they would be willing to participate in the study and handed out the CARE Measure. Patients could complete the CARE Measure in the waiting room and leave it there in a closed box, or fill-in at home (and return it by mail). In both cases, the GP had no knowledge of their patients' participation. Written information at the start of the questionnaire included that the questionnaire was anonymous and that the GP would not be informed about any of the given information. No exclusion criteria were defined, however if a physician estimated a patient to be unable to complete the questionnaire, he was allowed to exclude this patient. In the event of exclusion or refusal of participation by either the physician or patient they were asked to provide a written motivation. In case of children or disabled, assistance by others (e.g. family members) in completing the questionnaire was allowed.

Sociodemographic information

The questionnaire contained space to enter the patients' year of birth and the reason for refusal to participate in case a patient directly refused to participate. Furthermore, the following items were added: year of birth, gender, education, reason for the encounter with the GP (physical, psychological or other) and nationality.

CARE Measure

Subsequently the 10 items of the CARE Measure were added. The CARE Measure total score ranges from 10 to 50. GPs who are given a high score are experienced as more

empathic by their patient than GPs who are given a low score.

QUOTE questionnaire

As there does not exist a golden standard Dutch empathy measure, we chose the QUality Of care Through the patient's Eyes (QUOTE) to assess convergent validity in consultation with an expert in the area of empathy research. We included seven items from the QUOTE questionnaire focusing on the affective performance of the GP. The QUOTE total score ranges from 7 to 28. A high total score means that the patient experienced a highly affective communication style during the consultation (e.g. the GP being friendly, reassuring and open). Although the QUOTE questionnaire has been developed by the Dutch Institute for Research in Healthcare (NIVEL) for use in a National study on doctor–patient communication in general practice,[19] the items on affective performance have not been validated separately in general practice.

Data analysis: reliability and validity

Face and content validity were analyzed using the percentage of 'does not apply' responses to the CARE Measure items. Internal reliability (Cronbach's alpha) and homogeneity (item total correlations) of the Dutch CARE Measure items were analyzed using SPSS Statistics (20.0, IBM). Factor structure was determined by a factor analysis on the 10 items of the CARE Measure and the 7 QUOTE items (principal components analysis with varimax rotation). A Spearman correlation test was used to investigate convergent content validity of 'affective performance' as assessed with the seven QUOTE items and 'physician empathy' as assessed with the CARE Measure.

RESULTS

In total, 800 questionnaires were distributed by 19 GPs from 5 practices. The 682 questionnaires that were returned, included 26 questionnaires of patients refusing to participate and 1 of a GP excluding a patient, leaving 655 questionnaires (82%). Most reported reasons for refusal by patients were 'lack of time', 'not feeling like it', 'does not master Dutch language', 'unable to read questions (bad vision/no glasses)'.

Patient characteristics

The average age of the participating patient was 48.3 years, compared to 53.8 years in patients refusing to participate, a non-significant difference (p=.28). Most were Dutch (96%), female (63%) and 84% reported a physical problem as reason for encounter (Table 1). In 51% of the participating patients, the highest level of education was secondary school.

Table 1 *Characteristics of 655 Dutch patients from 19 GP's participating in the CARE measure validation study (2014)*

	n (%)
Age group	
<19	43 (6.6)
20-39	166 (25.3)
40-59	231 (35.3)
60-79	177 (27.0)
>80	21(3.2)
Missing	17 (2.6)
Gender	
Male	231 (35.3)
Female	411 (62.7)
Missing	13 (2.0)
Nationality	
Dutch	629 (96.0)
Other	13 (2.0)
Missing	13 (2.0)
Education	
No education	25 (3.8)
Primary school	69 (10.5)
Secondary school	336 (51.3)
Higher education	210 (32.1)
Missing	15 (2.3)
Reason for encounter	
Physical	538 (82.1)
Psychological	39 (6.0)
Other	64 (9.8)
Missing	14 (2.1)

Dutch CARE Measure

Of all 6550 items, only 33 (0.5%) were missing. The percentage of missing values on the individual items ranged from 0.2% to 1.1%. 'Does not apply' rates varied from 0.2% (Items 2 and 3) to 11.3% (Item 9) and 11.9% (Item 10). Table 2 shows the distribution of scores on all CARE Measure items. When excluding any questionnaires with missing or does not apply scores, the mean total CARE Measure score was 40.9 (SD 7.5, n=523) ranging between 22 and 50. In the explanation of the original CARE Measure, it is suggested to include questionnaires with up to two 'does not apply' scores or missing values, replacing them with the mean score of the remaining items. When

Table 2 *Distribution of Dutch Consultation and Relational Empathy (CARE) measure scores (n=655)*

CARE Measure item *How was the doctor at...*	Poor N (%)	Fair N (%)	Good N (%)	Very good N (%)	Excellent N(%)	Does not apply N (%)	Missing N (%)
1. Making you feel at ease *(being friendly and warm towards you, treating you with respect; not cold or abrupt)*	1 (0.2)	4 (0.6)	186 (28.4)	203 (31.0)	257 (39.2)	3 (0.5)	1 (0.2)
2. Letting you tell your story *(giving you time to fully describe your illness in your own words; not interrupting or diverting you)*	0 (0.0)	4 (0.6)	173 (26.4)	239 (36.5)	237 (36.2)	1 (0.2)	1 (0.2)
3. Really listening *(paying close attention to what you were sayings; not looking at the notes or computer as you were talking)*	0 (0.0)	12 (1.8)	150 (22.9)	245 (37.4)	246 (37.6)	1 (0.2)	1 (0.2)
4. Being interested in you as a whole person *(asking/knowing relevant details about your life, your situation; not treating you as "just a number")*	1 (0.2)	20 (3.1)	169 (25.8)	220 (33.6)	228 (34.8)	14 (2.1)	3 (0.5)
5. Fully understanding your concerns *(communicating that he/she had accurately understood your concerns; not overlooking or dismissing anything)*	0 (0.0)	5 (0.8)	172 (26.3)	231 (35.3)	237 (36.2)	8 (1.2)	2 (0.3)
6. Showing care and compassion *(seeming genuinely concerned, connecting with you on a human level; not being indifferent or "detached")*	1 (0.2)	9 (1.4)	167 (25.5)	231 (35.3)	232 (35.4)	12 (1.8)	3 (0.5)
7. Being positive *(having a positive approach and a positive attitude; being honest but not negative about your problems)*	0 (0.0)	5 (0.8)	176 (26.9)	223 (34.0)	233 (35.6)	14 (2.1)	4 (0.6)
8. Explaining things clearly *(fully answering your questions, explaining clearly, giving you adequate information; not being vague)*	0 (0.0)	6 (0.9)	148 (22.9)	229 (35.0)	259 (39.5)	9 (1.4)	4 (0.6)
9. Helping you to take control *(exploring with you what you can do to improve your health yourself; encouraging rather than "lecturing" you)*	0 (0.0)	12 (1.8)	163 (24.9)	204 (31.1)	195 (29.8)	74 (11.3)	7 (1.1)
10. Making a plan of action with you *(discussing the options, involving you in decisions as much as you want to be involved; not ignoring your views)*	2 (0.3)	7 (1.1)	155 (23.7)	188 (28.7)	218 (33.3)	78 (11.9)	7 (1.1)

Table 3 *Reliability and homogeneity of Dutch Consultation and Relational Empathy (CARE) measure (n=523)*

	Scale mean if item deleted	Corrected item-total correlation	Cronbach's alpha if item deleted
1. Making you feel at ease	36.77	0.847	0.972
2. Letting you tell your story	36.79	0.893	0.970
3. Really listening	36.75	0.878	0.971
4. Being interested in you as a whole person	36.83	0.862	0.971
5. Fully understanding your concerns	36.79	0.904	0.970
6. Showing care and compassion	36.79	0.902	0.970
7. Being positive	36.79	0.911	0.969
8. Explaining things clearly	36.69	0.838	0.972
9. Helping you to take control	36.87	0.857	0.971
10. Making a plan of action with you	36.80	0.853	0.971

Table 4 *Factor analysis of Dutch Consultation and Relational Empathy (CARE) measure and QUality Of care Through the patient's Eyes (QUOTE) questionnaire (n=523)*

	Component (factor)	
	Factor one	Factor two
CARE measure item 1. Making you feel at ease	0.921	0.133
CARE measure item 2. Letting you tell your story	0.913	0.144
CARE measure item 3. Really listening	0.911	0.150
CARE measure item 4. Being interested in you as a whole person	0.904	0.131
CARE measure item 5. Fully understanding your concerns	0.889	0.151
CARE measure item 6. Showing care and compassion	0.880	0.116
CARE measure item 7. Being positive	0.876	0.152
CARE measure item 8. Explaining things clearly	0.872	0.129
CARE measure item 9. Helping you to take control	0.859	0.170
CARE measure item 10. Making a plan of action with you	0.853	0.173
QUOTE item 1 The doctor has been friendly	0.077	0.831
QUOTE item 2 The doctor has taken my issues seriously	0.106	0.805
QUOTE item 3 The doctor has listened well to what I had to say	0.134	0.800
QUOTE item 4 The doctor has been open to me	0.120	0.739
QUOTE item 5 The doctor has taken enough time for me	0.081	0.700
QUOTE item 6 The doctor has empathized with me	0.156	0.686
QUOTE item 7 The doctor has paid enough attention to me	0.145	0.543

these questionnaires were included, the mean total score was 40.9 (SD 7.9, n=621) ranging between 22 and 50. The distribution of the total score was slightly skewed and 23% of the patients gave their physician a maximum score. The mean total score of the seven QUOTE items was 27.6 (SD 1.15), ranging from 17 to 28 and showing a very large ceiling effect with 84% of the patients granting their physician the maximum score.
Cronbach's alpha of the 10 items of the CARE Measure was 0.974 (n=523) and was reduced slightly by the deletion of any of the items, indicating high internal reliability (Table 3). Corrected item total correlations were found to be high in all items, with a minimum of 0.838. Factor analysis on the CARE Measure and QUOTE items revealed two factors (Eigenvalue>1), with the 10 items of the Dutch CARE Measure loading highly on the first and the 7 QUOTE items loading highly on the second factor. The two factors explained 70.5% of the variance according to the rotated sum of square loadings (Table 4). The CARE Measure total score correlated positively with the QUOTE total score (r=0.34, p<.001). Looking at the age, gender, education level and reason for encounter (physical or psychological) of the patients with valid CARE Measure scores, none of these characteristics correlated significantly with the total score of the CARE Measure.

DISCUSSION

In this study, we translated the original English CARE Measure into Dutch and examined its validity and reliability in a general practice population. Our findings show high internal reliability, a clear factor structure and confirmed significant convergent validity. The low number of 'not applicable' responses would suggest high face and content validity. These are promising results for this preliminary validation and are similar to English, Japanese and Chinese findings.[17,20,21]
The percentage of patients giving their physician a maximum score is in line with UK findings (23% in the Dutch version versus 26% in the UK version).[17] The very high Cronbach's alpha in our study (similar to the original and other translations) indicate that less items could still result in a valid questionnaire, although removal of any item did decrease the alpha value.

Analyzing face and content validity, we found that CARE Measure Items 9 and 10 had a relatively high percentage of 'does not apply' responses. This corresponds to the findings in the original, Chinese and Japanese CARE Measures.[17,20,21] These items address if the doctor was helping you to take control and to make a plan of action, items supporting so called 'shared decision-making'. One could speculate that not all patients appreciate this shared decision-making and that older patients possibly

might prefer a more paternalistic attitude of the GP. However, no differences in age between those with and without 'does not apply' response were found. In addition, it is well documented that patients of lower socioeconomic status tend to have less desire for shared decision-making.[9,22] In our sample, we did not find significant differences in education level between those with and without 'does not apply' responses on the items addressing shared decision-making. However, education level does not equal level of deprivation or socioeconomic status as defined in the other studies.

The modest convergent validity correlation with the QUOTE questionnaire (r=0.34) was an unexpected finding. It might be explained by the considerable ceiling effect of the QUOTE questionnaire in this study, causing a highly skewed data distribution. In accordance with this hypothesis, repeating the analysis without the patients with a maximum score on the QUOTE or CARE Measure raised the correlation to 0.48. Looking at all single item correlations in this sample, the highest correlations of 0.43 and 0.38 were between QUOTE Item 4 ('the doctor has been open to me') and CARE Item 8 ('... explaining things clearly') and QUOTE Item 2 ('the doctor has taken my issues seriously') and CARE Item 5 ('... fully understanding your concerns'), respectively. These are all still modest correlations compared to those that Mercer et al.[17] found with the Reynolds empathy measure (r=0.85) and the Barrett-Lennard empathy subscale (r=0.63). These measures, however, were not available in Dutch.

Next to the skewed data distribution, the differences in construction of the questionnaires could also have contributed to the modest correlation. The CARE Measure gives a number of practical examples below each item (Table 2), contrary to the QUOTE items which are single statements. The lack of validation of the QUOTE in this target group is another possible contributor to the modest correlation. And finally, there is also the possibility that the constructs 'affective performance' and 'physician empathy' as measured by QUOTE and CARE are simply not as similar to each other as we hypothesized.

Strengths and limitations

The robust translation and back-translation process, the high response rate to the study, the low amount of missing data and the relatively large sample size compared to the studies in other translated CARE Measures are strengths of our study. The Chinese and Japanese validation studies added general questions about consultation satisfaction, whether or not the patient would recommend the doctor to family or friends and satisfaction with consultation length to the questionnaire. We did not add these questions, nor any other measures to assess convergent or divergent validity, which could be seen as a weakness of our study. However,

we anticipated that an undue lengthening of the questionnaire would reduce the likelihood of patient participation.

CONCLUSION

As far as we are aware, the only empathy questionnaire recently available in Dutch relied on self-report by physicians, which does not always correlate to patient-reported empathy. This validation study is a first step in making the CARE Measure available for the most important participant in the health care system in the Netherlands to evaluate physician empathy: the patient. However, further research into the validity of the Dutch CARE Measure is needed. Divergent validity and discriminant ability between doctors will have to be investigated further in a representative sample of the Dutch population.

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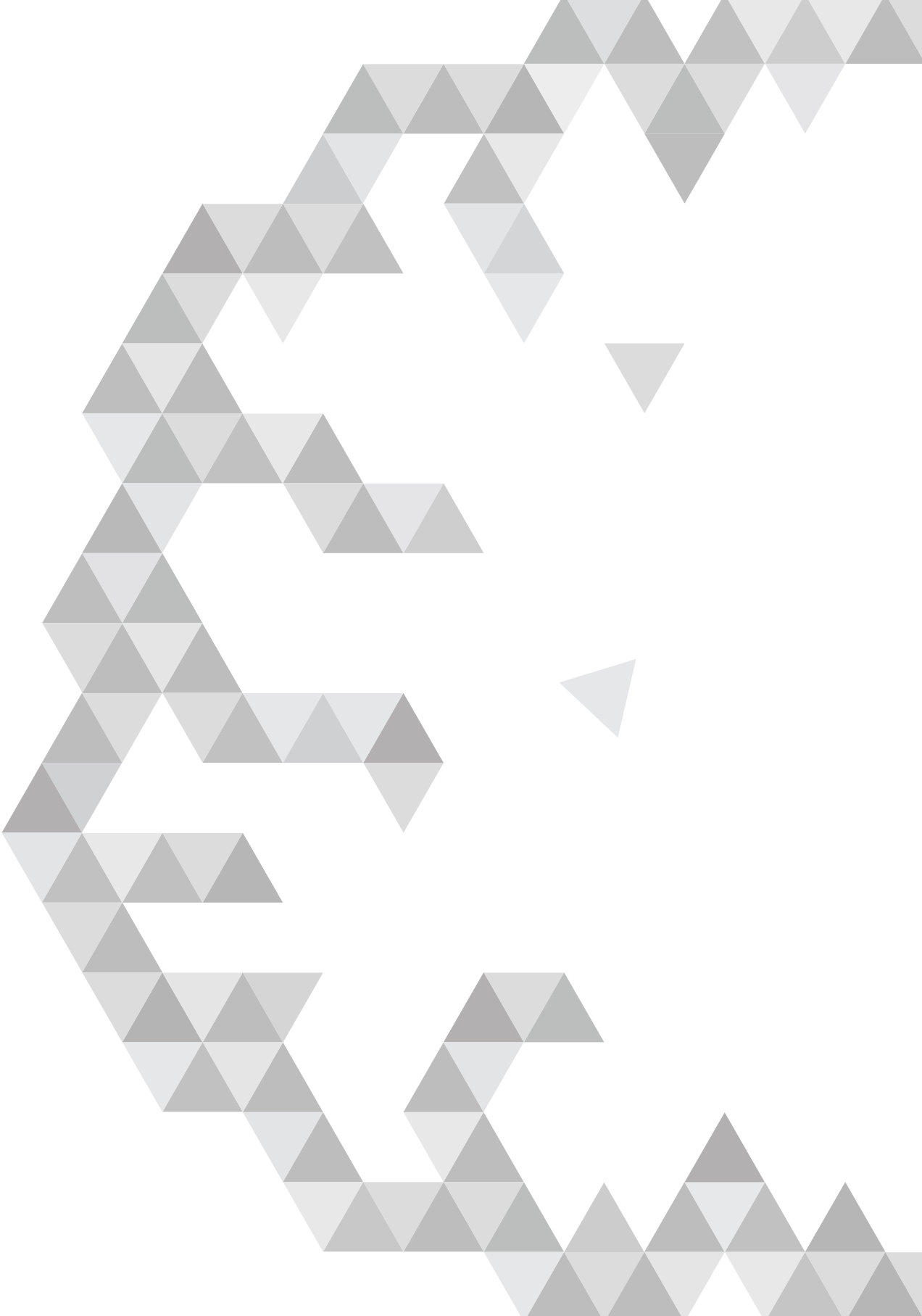

7

Does mindfulness training enhance simulated patient-rated empathy?

An exploratory study in medical clerkship students

Inge van Dijk, Peter L.B.J. Lucassen, Chris van Weel, Anne E.M. Speckens

Submitted

ABSTRACT

Theory

Physician empathy is an important element of quality of care, and is positively related to patient satisfaction, compliance and even to symptom severity and duration. The current study explored the effects of mindfulness-based stress reduction training (MBSR) on empathy of medical clerkship students as rated by simulated patients.

Method

A cluster-randomized controlled trial comparing the effects of clerkships with additional MBSR to clerkships as usual (CAU) on simulated patient-rated empathy of medical clerkships students. The study was embedded in an RCT examining the effects of MBSR on students' mental health conducted from 2011–2014 at a Dutch University Medical Center. MBSR consisted of 8 weekly 2-hour sessions, comprising didactic teaching, meditation exercises, and group dialogues. Simulated patients completed the Consultation and Relational Empathy measure at baseline and three months post-intervention after a consultation roleplay with students.

Results

Of 232 eligible students, 167 students participated (72%) and were randomized by clerkship group into MBSR (n=83) or CAU (n=84). At least one valid CARE Measure score could be obtained from 75 CAU students and 71 MBSR students. MBSR students did not show a significant improvement of empathy compared to those in the CAU group (change difference 2.3, 95%CI [-1.1-5.8], F(1, 159)=1.8, *p*=.18). However, baseline psychological distress moderated the effect of MBSR on student empathy. In students reporting clinical levels of psychological distress (above a validated cut-off score), simulated patient-reported empathy increased significantly in the MBSR group compared to the control group (change difference 11.23, 95%CI [4.33-18.13], F (1, 34)=10.93, *p*=.002).

Conclusion

These explorative results suggest that it is feasible to use a simulated patient-reported outcome measure for perceived empathy. Although there was no difference in pre-post change between the MBSR and control group overall, empathy of students with clinical levels of psychological distress did improve significantly after MBSR.

INTRODUCTION

The meeting between doctor and patient elicits mechanisms in the patient's brain responsible for expectations and trust, while similarly eliciting mechanisms in the doctor's brain responsible for empathy and compassion.[1] In addition to specific, therapeutic interventions such as medication or surgery, there is an increased interest in these non-specific, contextual factors of the doctor-patient relationship. Empathy is regarded a necessary characteristic of students entering medical school[2] and developing empathy for patients is described in the core medical competencies by the Accreditation Council for Graduate Medical Education[3] and the Royal College of Physicians and Surgeons of Canadian.[4] Patient-rated physician empathy positively influences patient satisfaction,[6,7] compliance,[6,7] enablement[8] and even the severity[9] and duration of symptoms.[10]

A wide range of possible interventions to enhance medical student empathy were studied in the last decennia.[5,6] The majority of studies examined communication skills training (n=10), practice of narrative and creative arts (n=11) or a combination of techniques, resulting in a mean effect size of 0.23. Most interventions employed practical training of students' behavior towards patients or exercises in taking the patient's perspective by means of creative practice such as theatre or reflective writing.[5–7] An alternative intervention which could potentially increase medical student empathy is a mindfulness-based stress reduction (MBSR) training. MBSR is an eight-week group training that teaches participants awareness of their body, sensory input, thoughts, and feelings with a curious, non-judgmental attitude. Participants practice meditation, mindful movement, group dialogues as well as deliberate awareness during daily activities. A well-developed sense of awareness of one's own thoughts, feelings and bodily signals during patient contact is suggested to be an important factor in empathy development.[8,9] Two RCT's in preclinical medical students examined the effect of MBSR on empathy amongst a number of other outcome measures.[10,11] One of them reported a significant improvement of empathy post-intervention.[11]

Past research indicated that the ability of physicians to accurately self-assess is limited[12] and that self-reported empathy was not associated with clinical competence of medical students.[7] Despite this, 17 out of 24 studies examining interventions to improve empathy used a self-report empathy measure, whilst only 6 used observer-rated and 1 a simulated patient-rated measure.[5,6,13] In addition, all of the aforementioned studies examining the effectiveness of MBSR in enhancing empathy of healthcare workers and medical students used self-report measures.

The current study aims to address above mentioned issues by exploring the effect of mindfulness-based stress reduction on simulated patient-rated empathy of medical clerkship students. Because we were interested if students' mental health would influence the effect of MBSR on empathy, we explored levels of psychological distress and positive mental health (positive feelings and adaptive psychological and social functioning) as possible moderators. In the past levels of psychological distress have repeatedly been found to moderate the effect of MBSR on several different outcome measures,[25–27] but positive mental health has not been examined as moderator before.

METHODS

Design

This study was embedded in a randomized controlled trial assessing effects of MBSR on mental health of medical clerkship students comparing clerkships augmented with MBSR to clerkships as usual (CAU). The study was conducted at the Radboud University Medical Center in Nijmegen, the Netherlands and the design is described in detail elsewhere.[17] We analyzed simulated patient-rated empathy at baseline and 3 months post intervention.

Procedure

The medical curriculum in Nijmegen consists of a three-year preclinical Bachelor study and a three-year Master study involving a fixed order of hospital placements alternated with short periods of didactic classroom teaching. From February 2011 to September 2012 we invited all first-year medical clerkship students that started their next clerkship in Nijmegen to participate in the RCT during a lecture in the core curriculum. Interested students left their email address and received an information leaflet by e-mail, thus enabling them to make their decision to participate outside of the teaching environment without any external pressure. Participating students completed a baseline survey and follow-up online surveys at 3, 7, 12, 15 and 20 months. These surveys contained, among other things, questions on demographic characteristics, mental health questionnaires and a self-report empathy measure and were accessible at home with a personalized link. All participating students gave informed consent before completing the survey. Students did not receive any incentives for participation. The medical ethical review board Arnhem-Nijmegen approved of the study.

Study population

During the inclusion period, 232 medical clerkship students (18 groups) started

their clerkships and were therefore eligible to participate. A total of 167 students participated (response rate 72%) of whom 83 students were randomized to MBSR training and 84 followed clerkships as usual (CAU).

Simulated patient-rated empathy

As part of the core medical curriculum, students attend regular workshops on communication skills, consisting of a theoretical explanation and role-plays with simulated patients using standard vignettes in small groups. After two of these workshops simulated patients were asked to assess student empathy directly after the consultation. The first assessment took place a week after the online baseline questionnaire was sent to students, and a few days after the first MBSR session. The second assessment took place about four weeks after the last MBSR session. The simulated patients act as co-teachers who are trained to assess students and give feedback on their performance. For this study, simulated patients were additionally instructed to complete the CARE Measure directly after each role-play, from the patient perspective. There was one central briefing informing the group of simulated patients on the background of the study and the CARE Measure. Moreover, they received brief instruction each month while preparing for the role-play. Simulated patients were blind to the treatment condition of students.

Outcome measures

Simulated patient-rated empathy (Consultation and Relational Empathy measure)

We used the definition of empathy by Mercer and Reynolds[14] as an ability to (1) understand the patient's situation, perspective and feelings (and their attached meanings); (2) communicate that understanding and check its accuracy; and, (3) act on that understanding with the patient in a helpful (therapeutic) way. In line with this definition, we chose the Consultation and Relational Empathy Measure (CARE Measure), developed by Mercer and colleagues,[15] to assess empathy as rated by simulated patients. The CARE Measure for assessing empathy was the only patient-rated measure out of 36 measures reported to rate empathy with adequate reliability, internal consistency and validity in a review of Hemmerdinger and colleagues.[16]

The CARE Measure consists of ten items that can be scored on a Likert scale from 1 (poor) to 5 (excellent) and a 'does not apply' option. It consists of questions like 'How was the doctor at fully understanding your concerns" or "How was the doctor at showing care and compassion". Each item is followed by a short explanation. The CARE Measure total score ranges from 10 to 50. GP's with high scores are experienced as more empathic by their patient than GP's with low scores. We used a translated and validated Dutch version with high internal reliability (Cronbach's alpha 0.974).[18]

Psychological distress
The Brief Symptom Inventory (BSI) is a 53-item questionnaire, measuring psychological symptoms of distress in both clinical and non-clinical populations. It comprehends the dimensions somatization, cognitive problems, interpersonal sensitivity, depression, anxiety, hostility, phobic fear, paranoid thoughts and psychoticism. Items are scored on a five-point Likert scale from 'none-at-all' to 'extremely'. The mean score on all 53 items is called the 'global severity index' (range 0-4) and is widely used in studies as a measure of overall psychological distress. A higher score indicates a higher level of psychological distress. Previous studies reported a high reliability and high validity of the Dutch BSI.[19,20] A score of 0.58 or higher on the global severity index is proposed as cut-off for psychopathology.[19]

Positive mental health
The 14-item Mental Health Continuum-short form (MHC-SF) measures emotional, psychological, and social well-being by means of questions such as, "During the past month, how often did you feel that you liked most parts of your personality?" and "During the past month, how often did you feel that you had warm and trusting relationships with others?". Items are scored on a 6-point Likert-type scale that ranges from 0="never" to 5="daily" (the total score can range from 0 to 70).[21] A higher score indicates higher positive mental health. In a representative sample of the Dutch population, the internal reliability of the full MHC-SF has been high (α=0.89) and its validity good.[22]

Mindfulness-Based Stress Reduction
The MBSR consisted of eight weekly two-hour sessions which took place during the introductory classroom teaching period (n=2), neurology clerkships (n=4) and psychiatry clerkships (n=2), from 4.30 PM to 6.30 PM. The curriculum was based on the MBSR as developed by Kabat-Zinn[21] and consisted of formal exercises, such as a body scan, sitting meditation and mindful movement, and informal exercises, such as a three minute breathing space and awareness of routine activities. Each session started with 10-15 minutes of interactive presentation about recognition of the theme of that week (for example 'the automatic pilot' or 'awareness of stress') in daily clinical practice. The content of the folder was adapted for use in medical clerkship students by adding examples from clinical practice. We asked students to practice 30 to 45 minutes daily and they received CD's to support home practice. A psychiatrist (AS) and a physician (MS) instructed the MBSR. Both teachers met the standards for UK good practice guidelines for teaching mindfulness-based courses.[22]

Statistical analyses

We collected self-report data with an online survey tool (Limesurvey) and simulated patient data with paper questionnaires. Both were anonymized before analysis. We did not perform a power calculation for the patient-rated empathy outcome measure because this was a secondary, explorative study embedded in the overarching RCT. We compared baseline characteristics and outcome measures between participants and non-participants, by means of Chi-Square and independent samples t-Tests. As the data were nested in two levels (individual students and clerkship groups), we used multilevel mixed effects models with a random intercept for both clerkship group- and individual students. The score on perceived empathy was defined as dependent variable and gender, age and baseline level of empathy were added as covariates. Time, condition (intervention or control group) and the interaction time X condition were defined as fixed effects in the model. We explored psychological distress and positive mental health (both continuous variables) as moderators of the effect of MBSR on student empathy by adding them as interaction with time and condition to the model. Mixed effects models analyses make maximum use of all available data as they include all students with one valid measurement even if the other is missing. All analyses were performed in IBM SPSS statistics for Windows, Version 21.0 (Armonk, NY) and graphs were made in Microsoft Excel 2013.

Table 1 *Baseline characteristics of medical clerkship students following clerkships as usual or clerkships with addition of mindfulness-based stress reduction*

	CAU (n=75)	MBSR (n=71)	*p* value
Demographic characteristics			
Age, mean (SD)	23.3 (1.63)	23.9 (2.80)	.14
Female gender, n (%)	65 (87)	50 (70)	.03
Relationship status, n (%)			
Single	31 (42)	35 (49)	.41
In relationship	43 (58)	36 (51)	
Mental health measures			
Psychological distress, mean (SD)	0.41 (0.27)	0.38 (0.27)	.51
Positive mental health, mean (SD)	45.1 (9.0)	44.9 (10.6)	.91

RESULTS

Of 232 eligible students, 167 (72%) agreed to participate of whom 83 followed a MBSR and 84 followed clerkships as usual. Of 146 students one or more valid CARE Measure scores could be obtained, 75 from the CAU group and 71 from the MBSR group. Measures with three or more 'does not apply' answers or missing values

Table 2 *Results of linear mixed models analyses of simulated patient-rated empathy in a sample of Dutch medical clerkship students who were randomized into CAU or clerkships with MBSR*

Simulated patient-rated empathy	Baseline M [95%CI]	Three months M [95%CI]	F	*p*	Cohen's *d*
Total group					
CAU (n=75)[a]	31.1 [29.1-33.1]	31.9 [29.9-33.8]	1.8	.19	0.19
MBSR (n=71)	29.7 [27.8-31.6]	31.8 [29.7-34.0]			
Low psychological distress					
CAU (n=56)	30.9 [28.7-33.1]	31.3 [29.0-33.5]	0.3	.57	0.03
MBSR (n=56)	30.7 [28.8-32.6]	31.3 [28.7-33.9]			
High psychological distress					
CAU (n=18)	32.0 [27.0-37.1]	33.3 [28.7-37.8]	10.8	.002	0.71
MBSR (n=15)	26.1 [20.2-31.9]	33.7 [29.5-37.9]			

*: the advised cut-off score of 0.58 was used to distinguish between low and high distress
a: for one student the psychological distress score was missing

were excluded from analysis as advised when using the CARE Measure (n=21).[15] Participants and non-participants of the study did not differ significantly in age, gender or relationship status. In addition, students with one or more valid CARE Measure scores (n=145) did not differ significantly in age, gender, relationship status and baseline levels of psychological distress and positive mental health of those of whom no valid CARE Measure score could be obtained (n=21). Table 1 provides demographic characteristics of the MBSR and CAU group.

The improvement of empathy in the MBSR group was not significantly greater than that in the CAU group (change difference 2.3, 95%CI [-1.1-5.8], F (1, 159)=1.8, *p*=.18). Explorative moderation analyses indicated that baseline psychological distress level moderated the effect of MBSR on student empathy (F (1,154)=2.6, *p*=.05) while positive mental health did not (F (1,154)=0.2, *p*=.95). To further explore the moderating effect of baseline psychological distress we performed subgroup analyses in students with low levels of distress and students with clinical levels of distress as defined by the validated cut-off score of 0.58.[23] In students with clinical levels of psychological distress, the MBSR group reported a significant increase in empathy compared to the CAU group (11.23, 95%CI [4.33-18.13], F(1, 34)=10.93, *p*=.002). In students with lower levels of distress, however, empathy levels remained stable in both groups (change difference -1.06, 95%CI [-5.00-2.86], F (1, 117)=0.29, *p*=.59) (Table 2).

DISCUSSION

This is the first study exploring the effectiveness of MBSR in improving simulated-patient reported empathy of medical clerkship students. We did not find a significant difference in improvement of empathy between the MBSR and CAU group. However, baseline levels of psychological distress moderated the effect of MBSR on student empathy levels. Additional subgroup analyses showed a significant improvement of simulated patient-rated empathy in the MBSR group compared to the CAU group in students with clinical levels of psychological distress at baseline. Whereas in students with lower levels of distress, empathy scores remained stable in both groups.

Comparison to literature

So far, literature on this topic is scarce. The only other study in medical students using a simulated patient-rated outcome measure to assess empathy included 22 medical clerkship students in an uncontrolled pre-post design of a two-day training in empathy consisting of didactic content, interactive demonstration, discussion and role-play. The authors found a significant pre-post increase in CARE Measure score with a moderate-large effect size (Cohens'*d*=0.75).[24]

The only study investigating the effect on empathy of a mindfulness-based intervention is the study by Grepmair and colleagues, who randomized psychotherapists in training to either a group that meditated each morning before therapy sessions or a group continuing practice as usual.[25] Patients of the meditating trainees gave significantly higher ratings of how they experienced the therapy sessions and reported significantly greater symptom reduction. The study did not focus specifically on empathy as outcome measure and it was delivered at the start of each working day instead of during a fixed time period, which makes it difficult to compare to our study.

Although previous research repeatedly indicated that people with higher levels of psychological distress improve more on several different outcome measures after MBSR compared to those with lower levels of distress,[26–28] the moderating effect on empathy levels is new. Possibly, clerkship students with higher baseline levels of distress learn in a different way from a training than those with lower levels. A qualitative exploration of differences in learning experiences during MBSR between students with high and low levels of distress could enhance insight into the mechanism of moderation.

Another explanation could be that psychological distress hinders students' empathic ability and mediates the effect of MBSR on empathy. Reducing distress would indirectly improve empathy. Mediation analyses would be necessary to examine this hypothesis. The fact that contrary to psychological distress, positive mental health

did not moderate the effect of MBSR matches the idea that these are two related constructs but not on the same continuum.[29]

Contrary to findings in studies using self-reported empathy measures,[7] there are a number of studies indicating that performance of medical students during simulated patient consultations is similar to their performance in consultations with real patients. Positive correlations were not only found between performance during general history taking and counselling skills,[30,31] but also specifically in empathic communication.[32] And similar results were found in residents.[33,34] Although methodology varies widely between these studies, they give an indication that effects found in simulated patients might be generalizable to behavior in real patients.

Strengths and limitations

The results of the current study encourage the use of (simulated) patient-reported empathy measures in research instead of the widely discussed self-report measures. Integration of the MBSR and the simulated patient ratings in the core curriculum, blinding of the simulated patients and the lack of students receiving an incentive are strong aspects of the study. That being said, there are a number of important limitations of our study to be considered. A clear weakness is the data loss due to unreturned CARE Measures and measures with too many 'does not apply' items resulting in a lowered response and a loss of power. When simulated patients were asked about reasons for not returning the CARE Measure, they mentioned mainly practical reasons like 'having forgotten to complete it' or 'feeling unsure about how to complete it'. The fact that there are no baseline differences between students with and without valid CARE Measure score makes it less likely that selective dropout occurred. However, for future research it would be better to prevent high dropout rates altogether by increasing supervision of the data collection by a research assistant and by instructing simulated patients more frequently. Other limitations are the lack of long-term follow-up; the performance in a single medical center; and the timing of the baseline measurement of the CARE Measure. We wanted to integrate the study in the period of neurology and psychiatry clerkships and make use of existing skills training. Due to the length of the intervention (8 weeks) it had to start shortly after inviting students to participate in the study to fit in this time-period. Unfortunately, as a consequence the baseline CARE Measure score could only be completed a few days after the first MBSR session as there was no other option in the core curriculum. This was also a few days later than the completion of the self-report measures of psychological distress and positive mental health. In future research it would be better to attempt to either adapt the length of the intervention or the time of the skills training.

The nearly statistically significant difference in baseline CARE Measure score is a

weakness of our study and must be an unintended consequence of the randomization procedure. Hypothetically, the significant effect of MBSR on simulated patient-rated empathy in the students with clinical levels of distress could have been caused by 'regression to the mean', the tendency of extreme values to be closer to average on a second measurement. This can only be investigated further by replication studies. Finally, students were rated only once and although there was a fixed pool of simulated patients, the post-intervention assessment was usually with a different simulated patient. In future studies it would be better if either multiple CARE Measures could be obtained and averaged for each student or students would be appointed to the same simulated patient twice. As our current findings are promising, they might justify a larger study in which these necessary adaptations can be made to the curriculum to improve the quality of the study.

CONCLUSION

This study explored the effect of MBSR on simulated patient-rated empathy. Although exploratory in nature, the results show that using simulated patient-rated empathy integrated in the existing curriculum is feasible and that empathy levels of students with clinical levels of distress might benefit most from MBSR.

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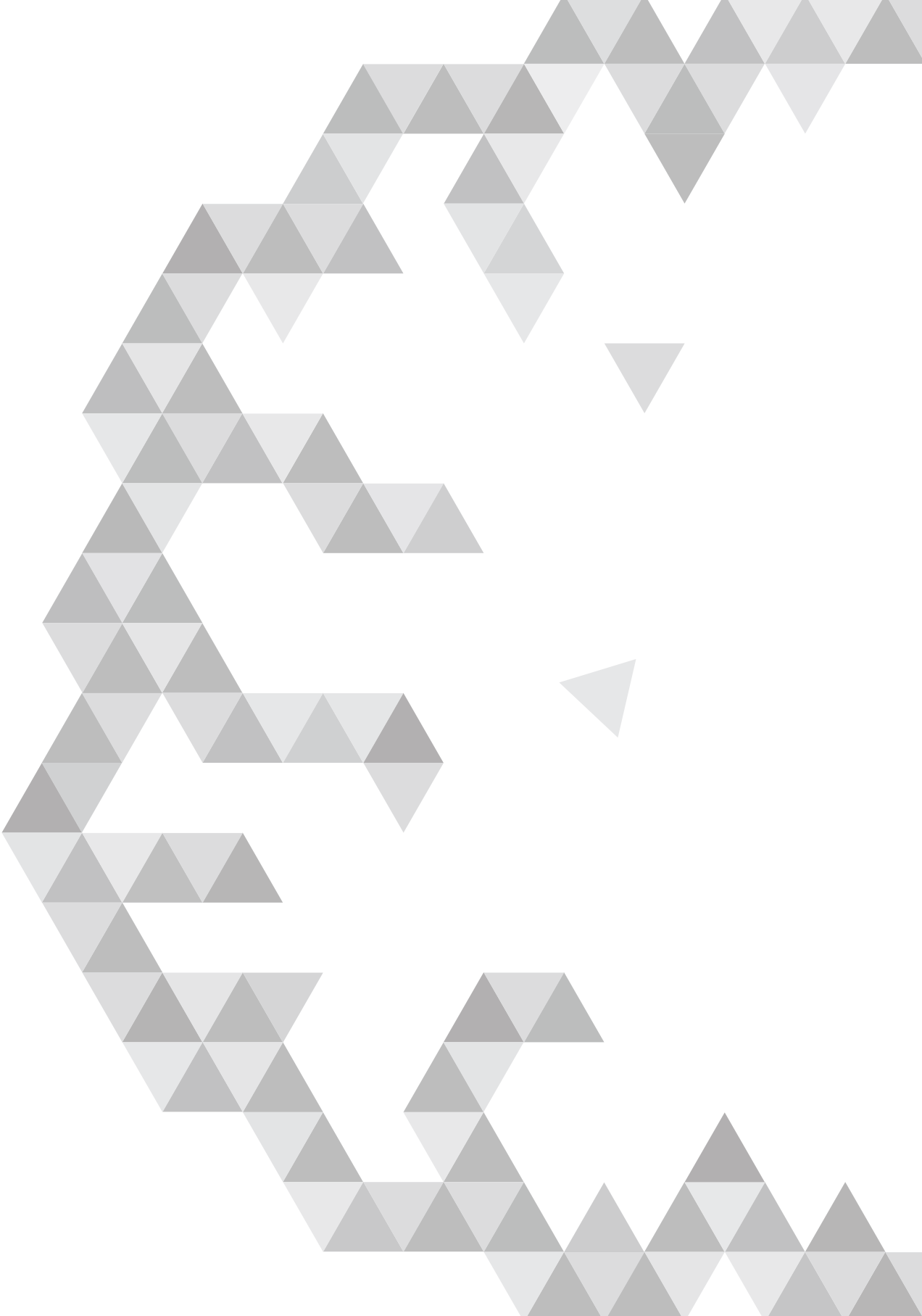

8

Summary and general discussion

SUMMARY

Complete mental health exists of the absence of psychological distress and the presence of positive feelings and positive functioning ('positive mental health'). Psychological distress is prevalent in medical students, but there is little knowledge about positive mental health. High levels of psychological distress and languishing positive mental health are related to worse self-reported functioning and lower self-reported empathy of medical clerkship students. Previous studies showed that mindfulness-based stress reduction (MBSR) decreased distress in medical students, but response rates were modest, follow-up was short and studies in medical clerkship students were underrepresented.

The current thesis examined three main topics:
1. Mental health of medical clerkship students;
We assessed prevalence rates and predictors of both psychological distress and positive mental health.
2. Effects of MBSR on mental health of medical clerkship students;
We used quantitative and qualitative methods to examine the long-term effects of an MBSR training integrated in the core curriculum.
3. Effects of MBSR on medical clerkship student empathy.
We explored the feasibility of using a simulated patient-reported instrument to assess physician empathy and used it to examine effectiveness of MBSR in enhancing student empathy.

1. Mental health of medical clerkship students
In chapter 2 we examined the prevalence of psychological distress and positive mental health and their possible predictors in all 454 fourth-year medical students of the Radboud University Medical Center in their first year of clinical clerkships. Of those eligible, 406 (89%) students completed the assessment, 86 (21%) of whom reported clinical levels of distress. We found a flourishing mental health in 159 (41%) students, meaning that they experienced feelings such as happiness and interest in life and reported positive psychological and social functioning such as self-acceptance and rewarding relationships. As hypothesized, psychological distress and positive mental health did not appear to be two ends of the same continuum: Students without psychological distress did not necessarily have a flourishing positive mental health and vice versa. Out of a number of possible contributing factors, psychological distress appeared to be most related to less 'acting with awareness' and more 'worrying'. Positive mental health, on the other hand, was strongly related to a lack of 'problem avoidance' and 'emotional irresponsibility' (the feeling that human suffering including your own is beyond your control). Although

no conclusion on causality can be drawn, this study supports the idea that self-awareness and active, nonavoidant coping strategies are related to lower distress and higher positive mental health. Supporting the development of these skills might contribute to student well-being.

2. Effects of MBSR on mental health of medical clerkship students

As previous studies on MBSR in medical students suffered from a low response rate and offered MBSR as elective, their results could have been distorted by selection bias. Students refusing participation in a study assessing the effect of MBSR could either be those less distressed and more mindful or those more distressed and less mindful. We performed a preliminary study (chapter 3) to examine the characteristics of students willing to participate in a training in terms of demographic information, levels of psychological distress, personality traits and mindfulness skills. Of 179 students included in the study, 97 (53%) indicated they would be interested in participating in a training. Interested students reported significantly higher levels of psychological distress and neuroticism than non-interested students. Subsequently, we compared the 167 (72%) participants in our randomized-controlled trial with 41 non-participants. Again, the participants reported significantly higher levels of psychological distress, worrying and problem avoidance and lower levels of mindfulness skills. Taken together, these results showed that by offering an MBSR training we probably do reach students who can benefit most of it, namely those with the highest distress levels and the lowest mindfulness skills.

In chapter 4 we discussed the results of a cluster-randomized controlled trial investigating the effects of MBSR training on psychological distress and positive mental health of medical clerkship students over the entire duration of their core clerkships. Of the 232 eligible fourth-year students at the beginning of their clerkships, 167 (72%) were randomized in their clerkship cohort to either clerkships as usual (n=83) or clerkships with addition of MBSR training (n=84). The students in the MBSR group reported a small statistically significant reduction of psychological distress (Cohen's *d*=0.20) and a moderate statistically significant improvement of positive mental health (Cohen's *d*=0.44) throughout the 20 months of clerkships. They reported a reduction in dysfunctional cognitions (Cohen's *d*=0.18) and an increase of mindfulness skills (Cohen's *d*=0.35) and life satisfaction (Cohen's *d*=0.51).

In addition to the randomized controlled trial, we conducted a qualitative study by interviewing 16 students two years after the training about the nature and effects of their current mindfulness practice (if present). We applied purposive sampling based on gender, clerkship group and satisfaction with the course, attempting to maximize diversity of the reported experiences. Chapter 5 summarizes the results of

the constant comparative analysis of the transcribed interviews. The 16 interviews resulted in six main themes related to the nature and effects of students long-term mindfulness practice; (1) the '*unchanged lifestyle*' reported by the students that discontinued practice; (2) understanding and intention as '*pre-conditions*' for developing long-term practice; (3) '*attention regulation and awareness*' during daily activities as core elements of students' long-term mindfulness practice; (4) practice sometimes resulted in '*changed ways of coping*' such as taking a pause, reflecting and recognizing automatic behavioral patterns, making room for a conscious response. Students described both conscious internal responses such as taking distance (decentering) from negative thoughts, as well as external responses such as changing behavior towards a clerkship supervisor or patient; (5) '*quality of life increased*' by enhanced enjoyment of daily activities, improved work-life balance and sometimes even different career choices and; (6) students reported practical, personal and professional '*barriers and facilitators*' of maintaining mindfulness practice. Overall, changes in attitude (e.g. non-judgment, compassion) seemed less present than changes in attention regulation.

3. Effects of MBSR on medical clerkship student empathy

In addition to using self-report empathy measures, we wanted to explore the effects of MBSR on medical clerkship student empathy as reported by patients after a simulated consultation. As the only patient-rated measure with evidence of reliability and validity was not available in Dutch, we translated it and conducted a preliminary investigation of its psychometric properties (chapter 6). We distributed this 10-item patient-rated Consultation and Relational Empathy Measure (CARE Measure) among patients of 19 general practitioners in 5 primary care centers and compared it to seven items of the QUality trOugh The patient's Eyes (QUOTE) questionnaire assessing 'affective performance' of the physician. Analyses of the 655 questionnaires that were returned showed high internal reliability of the CARE Measure (Cronbach's alpha 0.974) and a modest positive correlation (r=0.34) with the QUOTE confirming convergent validity.

Chapter 7 describes the exploratory secondary outcome measure of our randomized controlled trial comparing the effects of clerkships as usual (CAU) to clerkships with additional MBSR on simulated patient-rated empathy of medical clerkships students. Of 167 participating students, at least one valid CARE Measure score could be obtained from 75 CAU students and 71 MBSR students. Empathy increase in the MBSR group did not significantly differ from the increase in the CAU group (Cohen's d=0.19). However, baseline psychological distress moderated the effect of MBSR on student empathy. In students with pathological levels of psychological distress at baseline, simulated patient-reported empathy increased significantly in the MBSR group compared to a decrease in the control group (Cohen's d=0.71).

GENERAL DISCUSSION AND CONCLUSION

This thesis describes the results of a number of studies examining mental health of medical clerkship students and the effects of MBSR on mental health and empathy. In the current chapter we will give a comparison of our results to existing literature, discuss methodological considerations, strengths and limitations, describe implications for practice, for future research and end with an overall conclusion.

1. Mental health of medical clerkship students

Psychological distress in medical clerkship students

Looking at the current literature, the prevalence of clinical levels of psychological distress in our study (21%) is similar to the figures found in other Western developed countries such as America and Sweden,[1,2] but substantially lower than those found in clerkship students in Amsterdam.[3,4] As a national study on burnout among all faculties found no significant differences,[5] it does not seem likely that students in Nijmegen experience less distress than students from other Dutch universities. A more plausible explanation could be that the difference is caused by the higher response rate of 89% in our study compared to the 52% and 43% of the two studies from Amsterdam. The phenomenon that studies with higher response rates find lower distress levels is recognized by Hope and colleagues who describe it in their review on psychological distress.[2] In our own cross-sectional study comparing participants in our RCT to non-participants (chapter 3) we found that participants report significantly higher levels of distress. This confirms the likelihood of selection bias in studies with lower response rates.

Positive mental health in medical clerkship students

In our sample of medical clerkship students 41% reported a flourishing mental health, while 58% reported it to be moderate and only 1% as languishing. The prevalence rate of flourishing mental health in American medical students, however, was higher (53%), despite their demanding curriculum and high study debts.[6] Maybe the fact that entrance to American medical school is highly competitive might enhance levels of flourishing mental health of students by making them feel 'lucky' that they were accepted. Another explanation could be that flourishing mental health is more prevalent in Americans in general and not only in medical students. However, barely one fifth (17%) of American adults between the ages of 25 and 74 appeared to have a flourishing mental health.[7] American medical students seem to be a subgroup in this regard. This is similar in our group of Dutch medical students who also report higher levels of positive mental compared to the general Dutch population and their own age group.[8] Possibly, a higher socio-economic background

or personal characteristics of medical students might contribute to this difference. As hypothesized, the presence of psychological distress showed overlap with the presence of positive mental health, supporting the two continua model.

Factors contributing to psychological distress and positive mental health
'Acting with awareness' (negative), 'non-judging' (positive) and 'worrying' (positive) were the strongest predictors of psychological distress over and above demographic characteristics which we hypothesized to be related. Looking specifically at the relationship between mindfulness skills and psychological distress, it is interesting that 'acting with awareness' and 'non-judging' were repeatedly found to be strongly associated with lower levels of distress in healthy individuals as well as clinical populations.[9–12] People with high levels of awareness might be less bothered by ruminative thoughts and more responsive to their own needs, which could decrease psychological distress and vice versa. More longitudinal mediation studies would be necessary to examine these relationships further.
Students who approach problems in an active way and have a feeling that they are in control of their life report higher levels of positive mental health than those who avoid problems and feel that misfortune is beyond their influence. Studies in other target groups found similar relationships of positive mental health with agreeableness (being warm, empathic, friendly), with extraversion (being outgoing, social) and with psychological flexibility (the ability to accept aversive internal experiences).[13,14]
Overall these predictors of psychological distress and positive mental health confirm that a complete state of mental health is not only related to the absence of distress, but also to positive functioning such as healthy coping styles and experiencing an internal locus of control.

2. Effects of MBSR on mental health of medical clerkship students
The main results of our RCT showed that in the MBSR group levels of psychological distress were lower and positive mental health was higher throughout 20 months of follow-up. This is in line with the only other study of a manualized mindfulness based intervention in medical clerkship students of Garneau and colleagues.[15] It is interesting that Garneau and colleagues report larger effect sizes on depression (Cohen's d=0.58) and perceived stress (Cohen's d=0.34) than ours on psychological distress (Cohen's d=0.20). In contrast, our effect on positive mental health is moderate (Cohen's d=0.44), while theirs on psychological well-being (a subscale of positive mental health) was very small (Cohen's d=0.09). One way of explaining these differences could be pure methodological: we used different questionnaires and our effects sizes were calculated over the 20 months follow-up period rather than immediately post-intervention. Also, the students in the study of Garneau and

colleagues chose the intervention as an elective topic and were therefore possibly more distressed and more motivated.
Similar to the only other qualitative study exploring experiences of medical students upon completion of MBSR, our students also reported mainly attentional changes rather than attitudinal changes.[16] On the contrary, in a qualitative interview study among Dutch residents 'acceptance and non-judgment' came forward as one of five important themes in professional development after completion of MBSR.[17] Possibly the older age of residents, their professional experience and the fact that they self-selected into the RCT played a part. Many students in our sample did not have any understanding of mindfulness beforehand, which could have influenced their engagement in the training.
One important pitfall in offering mindfulness-based stress reduction training to medical clerkship students is that it could be seen as a 'quick fix' to improve students resources and reduce their distress while enabling them to maintain or enhance their workload in the hospital. This is related to the current understanding of mindfulness, to which we will get back later in this discussion. Fortunately, from our qualitative results it appeared that students did not experience MBSR as a 'quick fix', but as a support in reducing their workload by recognizing their own needs, standing up for themselves and setting boundaries in order to improve work-life balance. Finally, in our quantitative results as well as our qualitative results the effects of MBSR on positive mental health appeared larger than on psychological distress, indicating that also in students with little distress MBSR could still be meaningful. The name 'mindfulness-based *stress reduction*', is somewhat misleading in this regard.

3. Effects of MBSR on medical clerkship student empathy

The psychometric properties of the translated Consultation and Relational Empathy (CARE) measure are promising and show that it could be used in primare care research. Specifically validating its use in simulated patients might be of additional value. It is relevant that a Dutch patient-rated empathy measure is available next to the already available self-report measures because research so far showed that the ability of physicians to accurately self-assess is limited and self-reported and patient-reported empathy do not correlate.[18]
The results of our exploratory study examining the effects of MBSR on patient-rated empathy showed the feasibility of using a simulated patient-reported outcome measure. So far, almost all research was conducted using self-report measures. The most recent review of studies on interventions enhancing empathy in medical students, reports a mean effect size of 0.23 (Cohen's *d*).[19] This is close to the effect size of 0.19 that we found in the total student group and much lower than the 0.71 in clinically distressed students. Of 15 reviewed quantitative studies only 1 employed a randomized controlled design, but used a self-report measure. The current study is

the first RCT examining the effect of MBSR on simulated patient-rated empathy, and despite the methodological limitations, the results warrant further research.

Methodological considerations

Population

Based on the results of our preliminary study, the high response rate of our RCT was surprising. Maybe the fact that we invited students to participate in our RCT during a lecture about mental health of physicians contributed to this. This lecture did not exist at the time of the preliminary study. Online evaluations and interviews also showed that a number of students were not necessarily interested in mindfulness, but particularly wanted to support the research project. The downside of that lecture about the causes and consequences of physician distress and well-being is that it might have acted as intervention by itself. It was offered to all eligible students in both the intervention and the control group and might have reduced differences between them. The same applies to the completion of the online questionnaire every few months. This could have led to the 'Hawthorne effect'; the (usually positive) change that people experience when they know that they are being studied.

Intervention

We specifically chose to examine the eight-week MBSR, because it is manualized and therefore best comparable to existing literature in medical students and other target groups. We chose to offer MBSR in a face-to-face rather than a CD or DVD based intervention, as we preferred to offer students personal guidance and role-modeling in learning how to deal with their experiences. Instead of being offered by a teacher, we could also have arranged a peer-led MBSR, as that has shown some effectiveness.[20] But as role-modeling is important during times of professional socialization, we wanted students to be trained by someone with experience who could really support them in their process.

Outcome measures

In the current RCT we have sent students questionnaires during the periods of classroom teaching instead of during the clerkships to reduce the influence of specific clerkships. However, the follow-up measure at fifteen months was sent shortly before a holiday, which might have contributed to the improved mental health in both intervention and control group at that point in time. This was something that we had not foreseen and which should be taken into account when setting up comparable research.

Strengths and limitations

This thesis contains the first randomized-controlled trial in clerkship students, examining effects of the eight-week manualized MBSR, including long-term follow-up. Students in our RCT were not recruited by means of leaflets or e-mail, but were informed about the study during their regular classroom teaching. Therefore, the study population was more representative than that in other studies. Although students were not obliged to take part in the study, we reached a high response rate of 72%. In addition, the data collection of non-participants by inviting them to complete a baseline measurement addressed a gap in literature. Another strong aspect is the integration of the concept of positive mental health alongside psychological distress throughout the thesis, particularly because our study population mainly consisted of healthy young adults.

An important limitation of the studies in this thesis is that only students from Nijmegen were included. Although students rotated through different hospitals in the region, they all followed the same curriculum in Nijmegen. So we do not know if our results are generalizable to other medical schools in the Netherlands, let alone to students in other countries. The fact that burnout levels did not significantly differ between medical schools in the Netherlands, however, could support the case that distress levels might be similar across the Dutch medical curricula. Other limitations include the lack of active control condition of our RCT, the use of mainly self-report measures and the before mentioned methodological shortcomings of the exploratory study on simulated patient-reported empathy.

Recommendations for practice

MBSR in the core curriculum?

The main question deriving from our study is whether MBSR should be made available for all medical clerkships students by integrating it in the core curriculum. Based on the results of our study, there is some evidence in favor of this. Firstly, although the quantitative long-term effects are modest, in light of the relatively short investment of an eight-week training the effects are at least encouraging and might be enhanced when offering booster sessions. Even though students only rarely engage in formal practice after two years, almost all said they picked up something valuable from the training. Second, in our RCT students completed a treatment credibility and expectancy questionnaire at baseline asking them how logical and successful they think the training would be and how much they felt it would help them. Unpublished data from our RCT showed no correlation or moderation between treatment credibility or expectancy and any of the outcome measures. This is in line with the results from the interviews in which students who did not know anything

about mindfulness beforehand explain that they still got something useful out of the training. And lastly, competency based learning is increasingly applied in medical curricula worldwide. The CANMEDS physician competency framework, which is one of the most well-known and widely used frameworks, describes required competencies for a 'medical expert' divided over the roles of communicator, collaborator, leader, health advocate, scholar and professional.[21] One of the key competencies for the professional role is demonstrating a commitment to physician health and well-being to foster optimal patient care. MBSR specifically addresses these competencies and could therefore be a valuable part of the curriculum, supporting the development of students into balanced professionals.

Format of the training

When thinking about integrating MBSR in the core curriculum, we should also think about the timing and format of the training. According to students themselves, the timing at the beginning of clerkships was appropriate, as they were already a little used to clerkships and could integrate examples from clinical practice in the training such as dealing with suffering or a heavy workload. They clearly stated that clerkships were the time of higher distress levels and that it was useful to meet-up in those times. On the other hand they also made clear during the training as well as in the quantitative and qualitative study that they practiced very little because of their busy schedule and lack of free time. A possible solution for the lack of time could be to offer the training itself before the start of clinical clerkships and offer booster sessions during clerkships, so they would still be able to integrate examples from clinical practice in the exercises.

Based on the qualitative data students seem to have a strong preference for informal practice. In its classical eight-week format MBSR offers informal exercises mainly as part of homework. Integrating more informal practice in the training such as mindful speech and mindful eating might increase the total level practice and improve integration in daily activities. Another possibility might be to offer more diversity in audio material or making use of smart phone applications which are easily accessible. Exercises of different lengths with different use of wording, might give opportunities for a more individual approach. As we currently don't know the optimum balance between formal and informal practice, this might be an interesting area for further exploration.

The importance of the understanding of mindfulness

Choosing the timing and format of a training is very much related to the understanding of what mindfulness is. This understanding is a crucial basis for how students develop their mindfulness practice and if they experience long-term benefits. Students holding an more instrumental approach to mindfulness, seeing it as a

technique rather than a way of living, reported less profound attitudinal changes.[16]
The current understanding of mindfulness in society is also relevant in this regard. At the time, Jon Kabat-Zinn declared his motivation for developing MBSR was to make a contribution to the alleviation of suffering and a deeper understanding of human nature in a way that would be accessible to mainstream Americans facing stress, pain and illness who would otherwise never get in touch with Buddhist teachings.[22] He tried to prevent being seen as 'new age', 'mystic' or 'flakey' by using a secular highly structured training format. This clearly proved its value as mindfulness is currently integrated worldwide in health care and other settings. The downside of this is that by the widespread use in all kinds of (mental health) disciplines, the Western concept of mindfulness got further removed from its Buddhist roots and is sometimes oversimplified, something which is recognized by Kabat-Zinn as well.[23,24] In Western psychological traditions mindfulness is often regarded solely as a 'method' to reduce distress and relieve complaints.
From a Buddhist perspective, however, mindfulness is not a method in itself, but it is embedded in a whole transformation process towards enlightenment by recognising (1) the transient nature of experiences; (2) the suffering caused by habitual attachment and aversion; and (3) thoughts and feelings to be simply thoughts and feelings rather than aspects of 'self'. This is a radical change in perception that exists of different insights and takes time to develop. This does not mean that every mindfulness teacher or participant should be fully instructed on Buddhist teachings, but for a valuable understanding of mindfulness it would be of added value to know about the perspective of life-long learning.

So how to integrate mindfulness in practice?
In light of the above understanding of mindfulness, which is in line with the process of life-long professional learning as a physician, it would make more sense to spread out the intervention over a longer period than to abridge it or to meet multiple times a week to shorten the duration. Embedding a training into more widespread curricular changes could support the professional development of students even more. As the hospital world is a very strong culture with 'its own power hierarchy, its own language, its own inside jokes',[25] a broader and longer-term approach might be necessary to reduce possible negative effects of this 'hidden curriculum'. Slavin and colleagues examined a stepwise transformed curriculum including a reduction of competitiveness by changing the grading system to pass/fail, establishing learning communities composed of students and faculty who share common interests for research or service; and obligatory resilience / mindfulness training. They showed that these kind of changes do not have to be expensive and can result in substantially improved well-being among students and staff.[26]
Judging by a number of recent publications such as the "national framework for

action on improvement and leadership development"[27] of the British National Health Service and the recently published vision document of the Dutch Federation of Medical Specialists,[28] there is an increasing interest in supporting medical specialists in becoming or remaining vital, compassionate professionals not only reducing distress but actively enhancing positive health of patients. Mindfulness-based interventions could be one of the ways to contribute to that.

Recommendations for future research

Quantitative studies

Compared to previous studies, our RCT already addressed some methodological weaknesses by its high response rate and long-term follow-up. However, from an evidence-based point-of-view there are still some obvious improvements that could be made such as using an active control condition and a multi-center setting to improve generalizability. We also did not examine possible gender differences, which have been found in preclinical medical students in a previous study.[29] Extension of the research of other than self-report outcome measures, such as the CARE Measure, could improve knowledge on the effect of MBSR on professional functioning. In this vein, we could invest in outcome measures assessing the competencies as used in many medical school curricula worldwide.

One of the key elements of future mindfulness research should be to develop better ways of measuring mindfulness itself. There are differences in semantic understanding of questionnaire items depending on a person's mindfulness experience and there are potentially significant discrepancies between how mindful individuals belief themselves to be and how mindful they really are.[30,31] The 'experience sampling' method also called 'ecological momentary assessment' is an example of an alternative to self-report questionnaires which could improve future mindfulness research. With this method participants download a smartphone application which probes them at several moments a day asking them to indicate the degree to which they are attending to what they are doing. This measure of 'mind wandering' might be more accurate than the retrospective self-report measures. Experience sampling could also be used to measure affect states during the day or the recovery following a (negative) emotional event. Other ways of measuring mindfulness include neuropsychological tasks or 'breath counting' tasks, but these seem to be more focused on the consequences of mindfulness rather than on mindfulness itself.

Qualitative research

Doing more qualitative research on the topic of mindfulness is another way of

complementing quantitative outcome measures. Our qualitative study showed that although students all received the same training their learning experiences and the long-term impact of it is very diverse. MBSR tries to cultivate an open, accepting non-judging attitude in participants to all kinds of experiences, including difficult ones such as stress, pain or fear. By allowing these feelings instead of repressing them, a different relationship to these experiences might arise. This does not necessarily mean that stress, pain or fear have disappeared after a training. When using only quantitative methods the risk is that this process of change is missed.

Neuro-imaging studies
The heterogeneity of students experiences is also relevant for neurobiological research in the field of mindfulness-based interventions. Currently, most neuro-imaging studies are conducted with the assumption that mindfulness-based interventions result in a universal effect within one target group, for example that all participants experience an increased awareness of the body, while that might not be the case. This assumption could lead to erroneous results or to findings that are not specific enough. Grouping participants based on common subjective learning experiences might give other neuro-imaging results, but that has never been examined as yet.

CONCLUSION

One fifth of medical clerkship students experienced clinical levels of psychological distress, but twice as many experienced a flourishing level of positive mental health. Adding mindfulness-based stress reduction training to the clinical clerkship curriculum resulted in a small reduction of distress and a moderate improvement of positive mental health throughout 20-months of clinical clerkships. Two years after a training, the majority of students was still engaged in mindfulness practice albeit mostly infrequently and by means of informal rather than formal practice. Our qualitative results show that the long-term impact is diverse, including changes in attention and to a lesser extent changes in attitude. This complexity and diversity of this process supports the need for an understanding of mindfulness practice as life-long process of learning and gaining new insights as opposed to the secular application of mindfulness as a method to reduce distress.
Although the development of a realistic understanding of mindfulness during the training is important, a positive expectation *before* the training seems no necessary prerequisite for a positive long-term experience with mindful practice. This implies that integration of a training in the core curriculum could be considered rather than offering it as elective for students with high distress levels. This is supported by the

fact that students improved most on positive mental health and not on psychological distress. Offering a training shortly before clerkships with booster sessions throughout clerkships might give students more time to develop a personal practice and increase long-term impact. Integrating a training in more widespread curricular changes might be even better. As currently the importance of compassionate, self-reflective, well-balanced professionals promoting positive health is emphasized more and more, the time seems right for integrating mindfulness-based interventions in medical curriculum.

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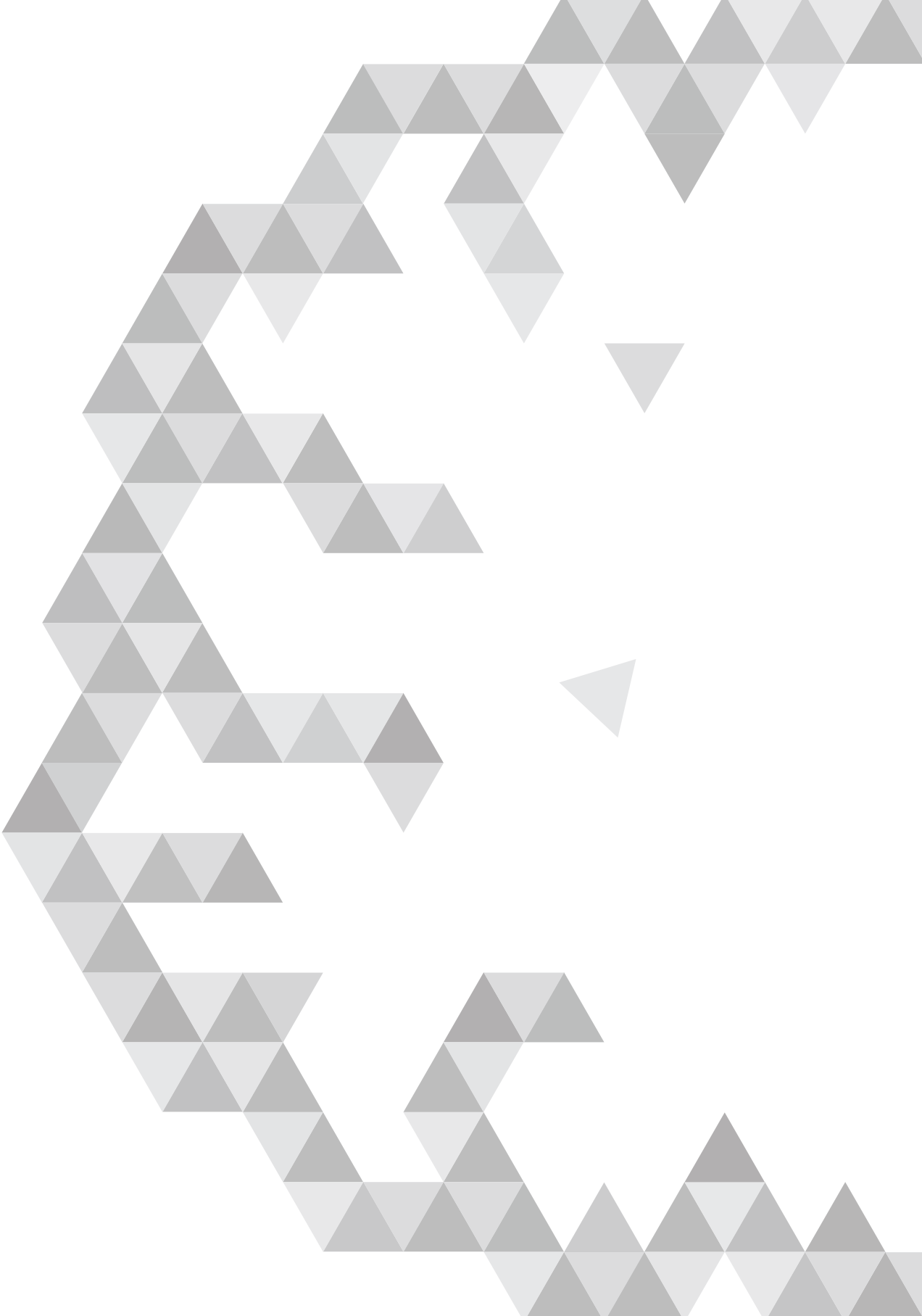

9

Nederlandse samenvatting

SAMENVATTING

De meeste geneeskunde studenten worden tijdens hun coschappen voor het eerst geconfronteerd met alle verantwoordelijkheden en de hoge werkdruk van hun toekomstig beroep. De coschappen worden door studenten vaak als een veeleisende periode ervaren waarin ze enerzijds weinig autonomie hebben, maar waarin ze anderzijds ook voor het eerst voldoening uit patiëntencontact kunnen halen. Volgens eerder onderzoek komen psychische klachten veel voor onder geneeskunde studenten, waarbij sommige studies een toename van klachten tijdens de start van de coschappen vonden. Geestelijke gezondheid bestaat echter niet alleen uit de de aan- of afwezigheid van psychische klachten, maar ook uit positieve gevoelens zoals geluk en tevredenheid, aanwezigheid van sociale contacten en aanpassingsvermogen (samen 'psychisch welbevinden'). Over psychisch welbevinden onder coassistenten is nog weinig bekend.

Het is relevant om interventies te onderzoeken die de geestelijke gezondheid van medisch studenten al tijdens de opleiding zouden kunnen verbeteren, omdat stress tijdens de opleiding voorspellend is voor een lagere tevredenheid na het afstuderen en voor latere werkgerelateerde problemen. Eerder onderzoek liet zien dat zowel interventies gericht op de *omgeving* als interventies gericht op de *persoon* effectief kunnen zijn in het verminderen van psychische klachten. Een voorbeeld van een persoonsgerichte interventie is Mindfulness-Based Stress Reductie (MBSR) training. MBSR training werd eind jaren '70 ontwikkeld om mensen met chronische pijn beter te leren omgaan met hun klachten. Het bestaat uit 8 wekelijkse bijeenkomsten van 2,5 uur waarin deelnemers op verschillende manieren oefenen om hun gedachten, gevoelens en gedrag te leren opmerken zonder er direct een oordeel over te hebben. Het gaat niet om het *praten over* complexe situaties, maar om het *zelf doen* van oefeningen zoals zitmeditatie, bewegen met aandacht, een bodyscan en het uitvoeren van dagelijkse activiteiten met aandacht. Het leren herkennen van automatische gedragspatronen geeft deelnemers de mogelijkheid om andere manieren te ontwikkelen voor het omgaan met stress en moeilijke situaties.
Uit eerdere onderzoeken bleek dat psychische klachten onder medisch studenten verminderden na het volgen van een Mindfulness-Based Stress Reductie (MBSR) training, maar de responspercentages waren bescheiden, de follow-up was kort en er is weinig onderzoek gedaan naar coassistenten.

Om meer inzicht te krijgen in bovengenoemde onderwerpen hebben we in dit proefschrift de volgende drie hoofdthema's onderzocht:

1. Geestelijke gezondheid van coassistenten:
We onderzochten het voorkomen en voorspellers van psychische klachten en

psychisch welbevinden.
2. Effecten van MBSR op de geestelijke gezondheid van coassistenten:
We gebruikten kwantitatieve en kwalitatieve methoden om het lange termijn effect van een MBSR training die geïntegreerd was in het kerncurriculum te onderzoeken.
3. Effecten van MBSR op empathie van coassistenten:
We deden een exploratieve studie naar het effect van MBSR training op empathie van coassistenten zoals beoordeeld door simulatiepatiënten.

1. Geestelijke gezondheid van coassistenten

In hoofdstuk 2 onderzochten we het voorkomen van psychische klachten en psychisch welbevinden en hun mogelijke voorspellers onder alle 454 vierdejaars medisch studenten van het Radboudumc in hun eerste jaar van de coschappen. Vierhonderdzes (89%) van deze studenten vulden de online vragenlijst in waarvan 86 (21%) een klinisch niveau van psychische klachten rapporteerden. Bij 159 (41%) studenten vonden we een hoog niveau van psychisch welbevinden, wat betekent dat ze zich regelmatig gelukkig voelen, geïnteresseerd zijn in het leven, tevreden zijn met zichzelf en met hun relaties met anderen. Overeenkomstig eerder onderzoek, bleken psychische klachten en psychisch welbevinden niet twee uitersten op één geleidende schaal te zijn: Studenten zonder psychische klachten hadden niet automatisch een hoog niveau van psychisch welbevinden en vice versa. Door middel van regressieanalyse onderzochten we voorspellers voor psychische klachten en psychisch welbevinden uit een aantal demografische kenmerken, dysfunctionele denkpatronen en mindfulness vaardigheden. De mate van 'bewust handelen' (aandacht hebben voor de activiteit waarmee je bezig bent) bleek het sterkst en negatief gerelateerd aan psychische klachten gevolgd door de mate van 'piekeren' (positief gerelateerd). Psychisch welbevinden daarentegen was het sterkst gerelateerd aan een laag niveau van 'problemen vermijden' en een laag niveau van 'emotionele instabiliteit' (het gevoel dat je geen controle hebt over menselijk lijden in het algemeen inclusief je eigen problemen). Uit deze studie komt naar voren dat het bevorderen van zelfbewustzijn en actieve coping strategieën de geestelijke gezondheid van studenten positief zou kunnen beïnvloeden. Doordat we een éénmalige meting uitvoerden (dwarsdoorsnede onderzoek) kunnen we echter geen conclusie trekken over oorzaak en gevolg binnen bovenstaande relaties.

2. Effecten van MBSR training op de geestelijke gezondheid van coassistenten

Doordat eerdere studies naar het effect van MBSR training bij medisch studenten vaak een laag responspercentage hadden en de training als keuzevak aanboden, zouden deze resultaten vertekend kunnen zijn door selectie. We voerden een voorbereidend onderzoek uit (hoofdstuk 3) om er achter te komen hoeveel

studenten er geïnteresseerd zouden zijn in deelname aan een MBSR training. Daarnaast onderzochten we of er verschillen waren tussen geïnteresseerde en niet-geïnteresseerde studenten op het gebied van demografische kernmerken, niveau van psychische klachten, persoonlijkheidstrekken en mindfulness vaardigheden. Van de 179 studenten waren 97 (53%) geïnteresseerd in een MBSR training. Geïnteresseerde studenten rapporteerden een statistisch significant hogere mate van psychische klachten en van de persoonlijkheidstrek 'neuroticisme' dan niet-geïnteresseerde studenten. Vervolgens vergeleken we de 167 deelnemers aan onze gerandomiseerde, gecontroleerde trial naar het effect van MBSR met de 41 niet-deelnemers. De deelnemers bleken significant hogere mate van psychische klachten, piekeren en probleemvermijding te ervaren en scoorden zichzelf lager op mindfulness vaardigheden. Samengevat laten deze resultaten zien dat wanneer we MBSR aanbieden aan coassistenten, degenen die meedoen waarschijnlijk degenen zijn die er het potentieel het meest aan hebben, namelijk de studenten met de meeste psychische klachten en de laagste mindfulness vaardigheden.

In hoofdstuk 4 bespraken we de resultaten van het cluster-gerandomiseerd, vergelijkend onderzoek naar het effect van MBSR op psychische klachten en psychisch welbevinden van coassistenten gedurende hun coschappen. Van de 232 vierdejaars studenten aan het begin van hun coschappen deden er 167 (72%) mee met het onderzoek. Vierentachtig coassistenten werden met hun cogroep gerandomiseerd naar het volgen van de coschappen zoals gebruikelijk (CAG) en 83 coassistenten naar het volgen een MBSR training ter aanvulling op het reguliere onderwijsprogramma. Slechts drie coassistenten maakten de training niet volledig af. De studenten in de MBSR groep rapporteerden een kleine, statistisch significante vermindering van psychische klachten (Cohen's d=0.20) en een middelgrote, statistisch significante verhoging van psychisch welbevinden (Cohen's d=0.44) ten opzichte van de CAG groep gedurende de 20 maanden van hun coschappen. Hun dysfunctionele denkpatronen verminderden (Cohen's d=0.18) en er was een toename van mindfulness vaardigheden (Cohen's d=0.35) en tevredenheid met het leven (Cohen's d=0.51). Samengevat bleek het volgen van MBSR training geïntegreerd in het reguliere curriculum haalbaar, acceptabel en leidde het tot positieve veranderingen in de geestelijke gezondheid van coassistenten.

In aanvulling op bovenstaand kwantitatief onderzoek interviewden we 16 studenten twee jaar na de MBSR training over de aard en het effect van hun huidige mindfulness beoefening. We selecteerden studenten gebaseerd op geslacht, cogroep en tevredenheid met de training, om de verscheidenheid van gerapporteerde ervaringen zo groot mogelijk te maken ('purposive sampling'). Hoofdstuk 5 geeft een samenvatting van de resultaten van de kwalitatieve analyse van de uitgetypte en

gecodeerde interviews volgens de 'constante vergelijkingsmethode'. Het coderen en groeperen van de gegevens resulteerde in zes hoofdthema's gerelateerd aan de aard en het effect van de mindfulness beoefening van studenten twee jaar na de training:
(1) Een **'onveranderde levensstijl'** werd beschreven door studenten die gestopt waren met mindfulness.
(2) Een reële definitie van mindfulness en een positieve intentie kwamen naar voren als **'randvoorwaarden'** voor het ontwikkelen van een lange termijn mindfulness beoefening.
(3) **'Aandachtsregulatie en bewustzijn'** tijdens dagelijkse activiteiten werd door nagenoeg alle studenten beschreven als belangrijkste onderdeel van hun mindfulness beoefening.
(4) Soms resulteerde mindfulness beoefening in **'veranderde copingstijlen'**, zoals het nemen van een pauze, reflecteren op een situatie en herkennen van automatische gedragspatronen. Dit kon leiden tot een bewustere reactie op een situatie. Studenten beschreven bewuste *interne* manieren van reageren zoals het afstand nemen van negatieve gedachten, maar ook *externe* manieren van reageren zoals het veranderen van gedrag naar een supervisor of patiënt.
(5) Als gevolg van deze veranderingen vond bij sommige studenten een **'verhoging van kwaliteit van leven'** plaats doordat ze meer konden genieten van dagelijkse activiteiten, een betere werk-privé balans konden hanteren en soms zelfs een ander specialisme kozen dan ze voorheen hadden gedacht.
(6) Tot slot kwamen er praktische, persoonlijke en professionele **'belemmeringen en bevorderaars'** van de mindfulness beoefening naar voren.
In zijn algemeenheid leken studenten vooral veranderingen in aandachtsregulatie te benoemen en in mindere mate veranderingen in houding zoals minder oordelen en meer compassie.

3. Effect van MBSR op empathie van coassistenten

We vonden het belangrijk om het effect van MBSR training op andere uitkomstmaten te onderzoeken dan alleen op door coassistenten zelf ingevulde vragenlijsten. Daarom exploreerden we de mogelijkheid om simulatiepatiënten de mate van empathie van coassistenten te laten beoordelen na een simulatieconsult en dat als uitkomstmaat voor het effect van een MBSR training te gebruiken. Uit literatuuronderzoek bleek dat de uit 10 items bestaande Consultation and Relational Empathy measure (CARE Measure) de enige vragenlijst voor (simulatie) patiënten was waarvan de betrouwbaarheid en validiteit voldoende onderzocht waren. Omdat de CARE Measure alleen in het Engels beschikbaar was, vertaalden we deze in het Nederlands en onderzochten een aantal van de psychometrische eigenschappen (hoofdstuk 6). We vroegen 19 huisartsen uit 5 eerstelijnscentra om de CARE Measure samen met vragen over de 'affectieve prestatie' van de huisarts uit

de QUality trOugh The patient's Eyes (QUOTE) vragenlijst na elk consult uit te delen aan hun patiënt. Uit de 655 vragenlijsten die werden geretourneerd kwam een hoge interne betrouwbaarheid van de vertaalde CARE Measure naar voren (Cronbach's alpha 0.974) en een bescheiden positieve correlatie met de QUOTE (r=0.34), die de convergente validiteit bevestigde. De vertaalde CARE Measure lijkt hiermee een bruikbaar instrument voor de (onderzoeks)praktijk.

Hoofdstuk 7 beschrijft een exploratief onderzoek naar het effect van MBSR training op empathie van coassistenten zoals beoordeeld door simulatiepatiënten na een consult. Deze studie was onderdeel van het gerandomiseerd vergelijkend onderzoek dat werd beschreven in hoofdstuk 4. We maakten gebruik van twee bestaande onderwijsmomenten waarin coassistenten met simulatiepatiënten een consult oefenden. Na het consult vulden simulatiepatiënten een CARE Measure formulier in om de mate van empathie van de coassistent te beoordelen. Simulatiepatiënten wisten niet welke studenten in de MBSR groep zaten en welke studenten in de controle groep. Van de 167 deelnemende studenten kon van 75 studenten uit de controlegroep en 71 uit de MBSR groep tenminste 1 geldige CARE Measure score verkregen worden. Er werd geen statistisch significant verschil in empathieverandering gevonden tussen de MBSR en de controlegroep (Cohen's d=0.19) voor en na de MBSR training. Echter, het startniveau van psychische klachten bleek het effect van MBSR op empathie te beïnvloeden. Bij studenten met een klinisch niveau van psychische klachten bleek de mate van empathie in de MBSR groep significant gestegen na de training ten opzichte van een daling in de controle groep (Cohen's d=0.71). Er waren een aantal belangrijke methodologische tekortkomingen zoals dataverlies door niet ingevulde CARE measures en een gebrek aan lange termijn metingen. Desondanks liet dit onderzoek zien dat het haalbaar is om een instrument dat ingevuld wordt door simulatiepatiënten als uitkomstmaat te gebruiken en dat de invloed van MBSR op empathie een interessant gebied voor nader onderzoek zou kunnen zijn.

Hoofdstuk 8 geeft een samenvatting van de bevindingen van dit proefschrift, gevolgd door een algemene discussie. We hebben de resultaten van onze studies met de bestaande literatuur vergeleken, bespraken methodologische overwegingen, sterke en zwakke kanten en deden enkele aanbevelingen voor praktijk en toekomstig onderzoek. Tot slot concludeerden we dat het toevoegen van MBSR training aan het kerncurriculum een positief langetermijneffect heeft op de geestelijke gezondheid van coassistenten. De langetermijntoepassing van mindfulness door studenten is heel divers en afhankelijk van veel factoren, onder andere van de definitie die de student van mindfulness heeft ontwikkeld. Dat pleit voor een definitie van mindfulness als hulpmiddel bij het levenslang professioneel leren in plaats van het te beschouwen als een snelle manier om stress te verminderen. Een positieve

verwachting van mindfulness lijkt geen voorwaarde te zijn voor een positieve langetermijnervaring met mindfulness beoefening. Dit zou een reden kunnen zijn om integratie van een training in het kerncurriculum te overwegen in plaats van het aan te bieden als keuzevak. Gezien de werkdruk en het gebrek aan vrije tijd tijdens de coschappen zou het aanbieden van een training kort vóór de coschappen met terugkombijeenkomsten tijdens de coschappen studenten meer gelegenheid kunnen geven om langetermijnbeoefening te ontwikkelen. In het licht van de toenemende maatschappelijke aandacht voor zorgprofessionals die duurzaam inzetbaar zijn en levenslang leren, lijkt de tijd rijp voor het integreren van mindfulness training in het medisch curriculum.

DANK

coassistenten
promotoren
copromotor

co-auteurs | andere betrokkenen
(ex)collega's | opleidingsgenoten
moss | kevin morby | arcade fire
buren | vrienden & vriendinnen
familie | zwagers | schoonouders
mama & papa★ | zus & broer
Roy, Hanne, Twan & Marte!

CURRICULUM VITAE

Inge van Dijk was born in Achterveld on March 18, 1979. She grew up in the countryside of Achterveld and completed secondary education (Atheneum) in Amersfoort in 1997. Inge studied occupational therapy in Amsterdam from 1997 to 2000. After a four-month graduation project in Jakarta and Surakarta, Indonesia, she took a chemistry exam and started medical school in Nijmegen in 2001. She combined medical school with a two-year Honours Programme.
Next to medical school, Inge worked as a skills trainer at the Occupational Therapy department of the HAN University of Applied Sciences. In 2005, she started her clinical clerkships after completing a three-month scientific clerkship in Lljubljana, Slovenia. She graduated medical school in 2007 and was accepted as a psychiatry resident in Nijmegen. During her psychiatry residency Inge developed a strong interest in psychotherapy.
In collaboration with the Department of Psychiatry and the Department of Primary and Community Care she started the research project described in this thesis in 2010. Next to her residency, Inge completed the two-year post-academic education to become a mindfulness trainer at the Radboud Center for Mindfulness (2012-2014). She completed her psychiatry residency in 2015 and since then has worked in different psychiatric departments.

Currently, Inge is working as a psychiatrist in an outpatient mental health service for deaf and hearing impaired in Utrecht and is enrolled in a two-year training to become a pesso-psychotherapist (body-oriented psychotherapy). She is married to Roy Visser and they are the parents of Hanne (2012), Twan (2014) and Marte (2016).

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